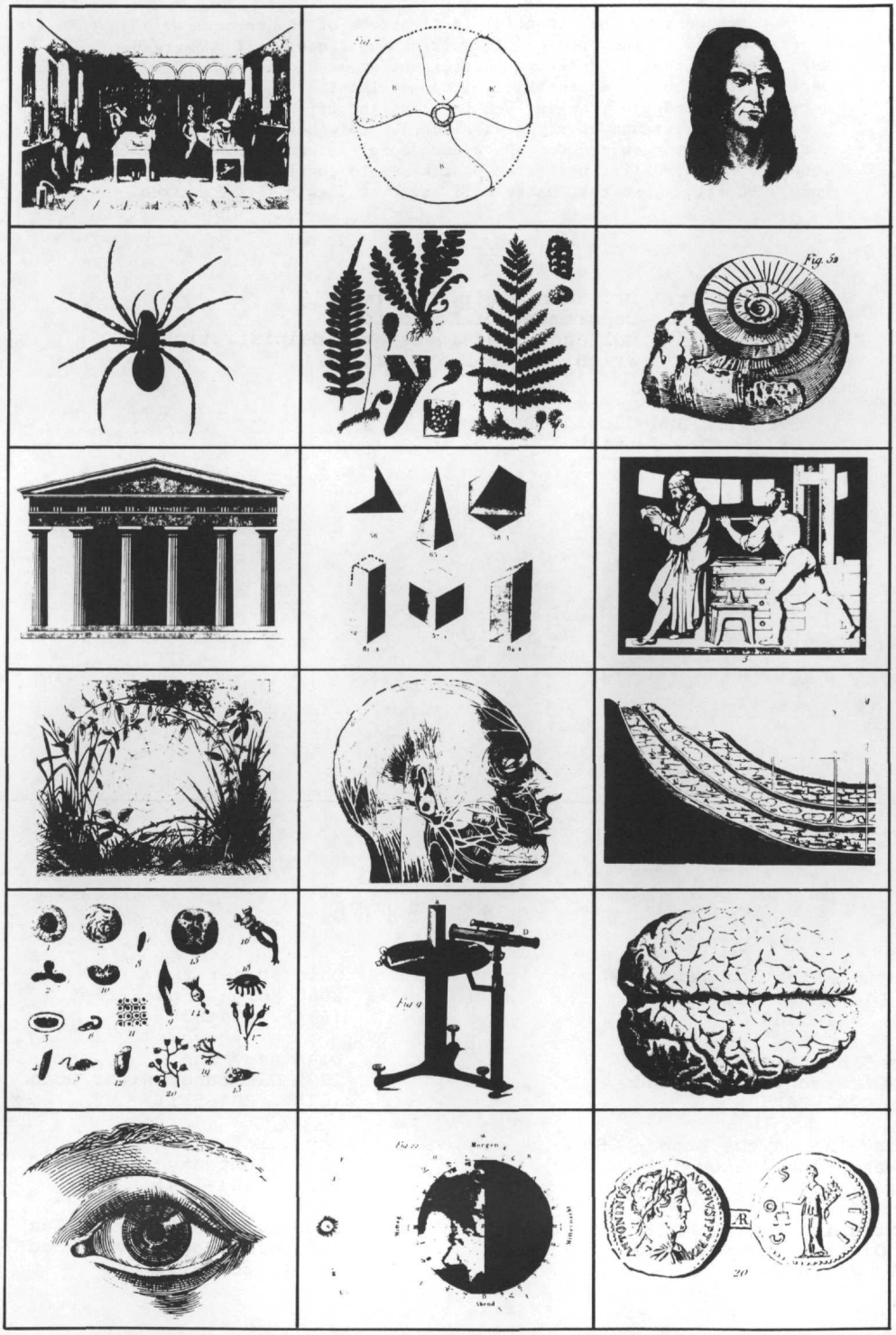
SECTIONAL MEETINGS

Details of technical meetings follow. See map for building locations. Business meetings are scheduled for each section. An important item of business is the election of officers.



A. ZOOLOGY

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 207

DAVID H. STANSBERRY, PRESIDING

8:30 MITOCHONDRIAL MALATE UTILIZATION AND NADPH·NAD TRANSHYDROGENATION IN ADULT HYMENOLEPIS DIMINUTA (CESTODA). Jeffrey R. McKelvey and Carmen F. Fioravanti. Department of Biological Sciences, Bowling Green State University, Bowling Green, Ohio 43403.

Physiologically, Hymenolepis diminuta is energetically anaerobic. Cytosolic malate, arising from glucose catabolism, serves as the substrate for a mitochondrial dismutation reaction, leading to anaerobic ATP generation. Presumably, mitochondrial, NADP-specific, "malic" enzyme is the source of required reducing equivalents. However, electron transport in H. diminuta requires NADH. Thus, a mechanism is necessitated for hydride ion transfer from NADPH to NAD, if "malic" enzyme is the source of reducing power. The H. diminuta, mitochondrial NADPH:NAD transhydrogenase would fulfill a hydride-transfer function. In this study, the cestode's transhydrogenase was found to be unaffected by Mn^{++}ion, and the specificity of "malic" enzyme for NADP and Mn^{++}ion was confirmed. Significantly, coupling of "malic" enzyme with transhydrogenation was demonstrated, since Mn^{++}ion stimulated acetylpyridine NAD reduction when malate and NADP were present in the assay system. The tandem catalytic activity of NAD-linked, malate dehydrogenase and oxalacetate decarboxylase did not account for the required NADH accumulation. These data are consistent with the supposition that indeed the "malic" enzyme and transhydrogenase are required for anaerobic phosphorylation. Supported by NIH 5-RO1-AI-15597 and 1-KO4-AI-00389, USPHS.

8:45 ENZYMATIC ACTIVITIES ASSOCIATED WITH THE MICROSOMAL FRACTION OF ADULT HYMENOLEPIS DIMINUTA (CESTODA). Curtis L. Batten and Carmen F. Fioravanti, Department of Biological Sciences, Bowling Green State University, Bowling Green, Ohio 43403

Energetically, the adult intestinal cestode, Hymenolepis diminuta, is essentially anaerobic and succinate accumulates as the major end-product of glucose dissimilation. Physiologically, mitochondrial ATP generation occurs via an electron transport-associated, fumarate reductase system without the need for oxygen. However, despite this anaerobic nature, H. diminuta assimilates oxygen when available indicating that oxygen may be involved in metabolic processes other than energy generation. Studies with the microsomal fraction of H. diminuta suggest that, in part, oxygen utilization may be the result of enzymatic components associated with this fraction. Based on the distribution of succinate dehydrogenase activity, prepared H. diminuta microsomes appear to be relatively free of mitochondrial contamination. Oxygen utilization by the microsomes is apparent in that this fraction catalyzes a reduced pyridine nucleotide oxidase activity (NADH or NADPH). This NAD(P)H oxidase has been found to be insensitive to both rotenone and antimycin A. Moreover, an NAD(P)H-coupled cytochrome c reductase is displayed with NADH being the preferred reductant. Whether this cytochrome c reductase activity is an indicator of cytochrome P-450 involvement (and therefore mixed-function oxygenation) remains to be determined. Interestingly, H. diminuta microsomes also exhibit an NADPH:NAD transhydrogenation mechanism as assessed by acetylpyridine NAD reduction. Supported by NIH 5-RO1-AI-15597 and 1-KO4-AI-00389, USPHS.

9:00 APPARENT SUBSTRATE-INDUCED CONFORMATIONAL CHANGE OF ADULT HYMENOLEPIS DIMINUTA (CESTODA), MITOCHONDRIAL NADPH:NAD TRANSHYDROGENASE. Denise A. Malcuit and Carmen F. Fioravanti. Department of Biological Sciences, Bowling Green State University, Bowling Green, Ohio 43403.

The mitochondrial NADPH:NAD transhydrogenase of H. diminuta, catalyzes a hydride ion transfer from NADPH to NAD, producing NADH. As such, this enzyme serves a vital function in the anaerobic energetics of the cestode by linking the mitochondrial, NADP-specific "malic" enzyme with the NADH-requiring, electron transport-associated, fumarate reductase system. Recent studies, dealing with thermal denaturation, revealed that the H. diminuta, NADPH:NAD transhydrogenase is subject to substrate-dependent conformational variation. Transhydrogenase activity was assessed by the reduction of acetylpyridine NAD employing isolated mitochondrial membranes as the enzyme-source. The rate of thermal inactivation of the transhydrogenase was accelerated markedly by the addition of NADPH or NADP to the system. NADPH was the more effective in increasing thermal lability. The increased thermal lability was dependent upon substrate concentration. Whether NADH or NAD alters the enzyme's thermal inactivation profile remains to be determined. However, the data obtained indicate that the transhydrogenase undergoes substrate-induced conformational change which, in turn, would be consistent with the supposition that proton translocation may be associated with this transhydrogenation. Supported by a Sigma-Xi Grant-in-Aid-of-Research and NIH 5-RO1-AI-15597 and 1-KO4-AI-00389, USPHS.

9:15 THE SPECIFIC DISTINCTNESS OF TOXOLASMA LIVIDUS (RAFINESQUE, 1831) AND TOXOLASMA CYLINDRELLUS (LEA, 1868) (MOLLUSCA:BIVALVIA:UNIONOIDA). David H. Stansbery, Ohio State University Museum of Zoology, 1813 N. High St., Columbus, OH 43210.

Taxa in the unionid genus Toxolasma Rafinesque, 1831 have been plagued with systematic and nomenclatural problems since their description (Barnes 1823, Rafinesque 1831, Lea 1831-1869, and Conrad 1838) over a century ago. Toxolasma lividus and T. cylindrellus were originally described as distinct taxa but, due to their superficial similarity, they were soon relegated either to subspecies status or synonymized. A recent study of 128 lots comprising 536 specimens of T. lividus and 74 of T. cylindrellus reveals these names to represent two distinct taxa. These species differ in growth rate, maximum size, proportions, degree of sexual dimorphism in the shell, color of periostracum and color of the nacre.

9:30 HOST-COMMENSAL RELATIONSHIPS OF CRAYFISHES AND OSTRACODS OF THE GULF COASTAL PLAIN, U.S.A. H. H. Hobbs III, Department of Biology, P. O. Box 720, Wittenberg University, Springfield, Ohio. 45501.

Crayfishes from the south-central Gulf Coastal Plain were individually collected from streams, roadside ditches, and burrows and were examined for epizootic entocytherid ostracods. Thirty-four species of ostracods, representing nine genera were encountered, of which 15 were undescribed species: Ankylocythere (15), Dactylocythere (1), Entocythere (4), Geocythere (3), Hartocythere (1), Ornithocythere (3), Saurocythere (1), Thermastrocythere (1), and Uncinocythere (5). Twenty-one species (61.8%), five genera, were ubiquitous, being found on burrowing crayfishes inhabiting seepage areas, flatwoods, and floodplains of streams and also were collected from crayfishes found in ditches, ponds, lakes and streams. Ankylocythere sinuosa (Rioja) had the largest geographical range and was found on the greatest number of hosts of any of the ostracods on the plain. Eight species (23.5%), three genera, demonstrated "ecological specificity" as they were associated with multiple crayfish hosts which spend all or most of their lives in burrows. Five species (14.7%), four genera, of ostracods were restricted to a single primary burrowing crayfish host, Cambarus (Lacunicambarus) diogenes diogenes Girard; Geocythere geophila (Hart), Hartocythere torreya (Hart), Ornithocythere aetodes Hobbs, Ornithocythere gypodes Hobbs, and Saurocythere rhipis Hobbs. Other ostracod species were found in the same localities on different hosts and some of these same ostracods were found also on C. (L.) d. diogenes; this adds credence to an assumption of host specificity for these five species.

9:45 RHTHMIC SECRETION FROM THE HEPATOPANCREAS OF THE CRAYFISH, ORCONECTES RUSTICUS, AND A SECRETORY RESPONSE TO CAERULEIN. Natalie Schoch and E. J. DeVillez, Dept. of Zoology, Miami University, Oxford, Ohio 45056

Gastric juice samples and hepatopancreatic extracts were obtained from a population of previously starved O. rusticus at half hour intervals following a brief period of feeding. Tryptic activity in the gastric juice displayed a cycling pattern with maxima at 0.5 and 3.5 to 4.0 hours after feeding. Tryptic activity in hepatopancreatic extracts fluctuated greatly showing maxima at the onset of feeding and at 1.0 and 5.5 hours after feeding. Biological activity of the hormone, caerulein, was also examined. Doses of 5 ug/0.1 ml caerulein were given to a group of starved crayfish. Sham injections containing cytochrome c were administered to a second starved population. In each case, gastric juice samples were obtained at 1.0 and 4.0 hours after injection. Tryptic activities in the gastric juice samples from the caerulein injected animals at 4.0 hours after injection were significantly higher than the activities of the cytochrome c injected animals at either time. No significant changes were observed in amylase activities.

10:00 THE PHYLOGENY OF THE SUBGENUS CAMBARUS AND THE CAMBARUS BARTONII BARTONII COMPLEX (DECAPODA: CAMBARIDAE). Roger F. Thoma, The Ohio State University Museum, Ohio State University, Columbus, Ohio 43210.

Multivariate analysis was performed on 830 specimens of the subgenus Cambarus, formerly considered to be 4 species. My analysis has revealed a complex of 12 taxa that form 4 groups. Cambarus sciotensis Rhoades 1944 shows closest affinity to an undescribed species in the Clinch and Powell River drainages of Tennessee and Virginia. Cambarus bartonii carinirostris Hay 1914 shows closest affinity to a form isolated in the Linville River of North Carolina. Cambarus bartonii bartonii (Fabricius 1798), Cambarus howardi Hobbs and Hall 1969, and 4 other forms comprise the largest group, its greatest diversity in the southern Appalachian Mountains. Cambarus ortmanii Williams 1907, Cambarus bartonii cavatus Hay 1902, and an undescribed species from Ohio constitute the last group.

10:15 THE EFFECTS OF SYNTHETIC PYRETHROIDS ON THE FEEDING BEHAVIOR AND DISPERSAL OF THE TWO SPOTTED SPIDER MITE. David C. Iftner, Department of Entomology, O.A.R.D.C., Wooster, OH 44691.

The effects of synthetic pyrethroids on the feeding behavior and dispersal of the two spotted spider mite, Tetranychus urticae Koch, were studied. Mites were placed on lima bean foliage treated with the synthetic pyrethroids; fenvalerate and permethrin, and the organophosphate insecticide, phosmet, with observations on the mites' behavior studied over time. No significant difference was found between mite feeding behavior and dispersal in mites on untreated foliage versus mites on phosmet treated foliage. Significant differences were found between feeding behavior and dispersal responses in mites from synthetic pyrethroid treated foliage, compared to responses of mites from phosmet treated foliage and untreated foliage. Due to the repellancy of the synthetic pyrethroids, mites on those surfaces exhibited reduced feeding behavior, different searching and probing behavior, and tended to move from areas of high synthetic pyrethroid residues to areas lower or completely absent of synthetic pyrethroid residues. Of the synthetic pyrethroids, fenvalerate exhibited the greatest repellency and the most severe effects on the mites over time. Experiments were conducted under laboratory light, at 24°C and at 25% R.H.

10:30 A COMPARATIVE STUDY OF GUT ULTRASTRUCTURE IN TWO SPECIES OF SCAPHIOPUS LARVAE. C. Sue Justis and E.J. DeVillez. Zoology Department Miami University Oxford, Ohio 45056.

Larvae of two species of spadefoot toads (Scaphiopus multiplicatus and S. bombifrons, subgenus Spea) exhibit an anatomical and behavioral polymorphism associated with a carnivorous or omnivorous diet. In order to determine whether or not this polymorphism extends to the physiological and ultrastructural levels, gross, light, and electron microscopic analyses of the esophagus, posterior foregut, anterior intestine, and pancreas have been conducted. Initial results indicate that although the prey-seeking and voracious feeding habits of the carnivorous larvae are more adult-like, the histological and physiological developments of the foregut follow the same basic patterns as the omnivores. In extreme carnivores and extreme omnivores, the foregut is composed of columnar epithelium and mucous cells until emergence of the front legs when secretory glands containing oxyntic cells begin to form.

10:45 NEWT (TARICHA GRANULOSA) SKIN EXTRACTS STIMULATE TETRODOTOXIN-INSENSITIVE TISSUE. Robert T. Nowak and Douglas H. Taylor, Miami University, Oxford, Ohio 45056

The skin of newts contains noxious and toxic componemts. One of these is tetrodotoxin (TTX), a potent neurotoxin. Tetrodotoxin blocks sodium ion flow into skeletal muscle and nervous tissue cells. Some tissues, such as vertebrate unitary smooth muscle, are TTX-insensitive. Isometric tension recordings were taken from spontaneously active rat uterine and frog stomach muscle strips. Administration of TTX to the bathing solution had no effect. Administration of as little as 0.0004 cc skin/cc bathing solution produced a sustained contraction (contracture) of the muscle. The potential adaptive advantage of these compounds will be discussed.

A. ZOOLOGY

FIRST AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 207

1:30 BUSINESS MEETING

PHARYNGEAL JAW STRUCTURE OF OSCAR, ASTRONATUS OCELLATUS. Hiran M. Dutta and Lisa Lowery. Department of Biological Sciences, Kent State University, Kent, OH 44242.

2:00

Astronatus ocellatus (Oscar), is a large cichlid fish from upper Amazon, shows no preference to eating hard processed food off the bottom or the fish they are usually fed. Their way of feeding and the supplementary structural configurations of the pharyngeal jaw have led to the possibility that Astronatus pharyngeal jaws are of an intermediate or transitional type and are specialized for neither mollusc type or fish prey. The intermediate status of the pharyngeal jaw has been observed in respect to the form and arrangements of the teeth and the musculature. Oscar basically has molariform teeth with a knob-like protrubarence, located in the parasagittal rows. Their short and stout teeth stand in contrast to the thin and tall teeth of piscivores types. Although the teeth are molariform, they are not totally flat. Totally flat molariform teeth are typical of highly specialized mollusc crushers. The m. levator posterior in molluscivores is very prominent and multipinnate, but parallel in piscivores. The levator posterior of Oscar is not multipinnate, but like other pharyngeal muscles of this fish is parallel fibered. Piscivores fish show larger levator externi (LE). The LI of Oscar is intermediate in size and the LE is not so extensize. Due to the lack of pinnate musculature and more massive origins and insertions it seems that Oscar is not specifically adapted for hard shelled prey; however, it does have the capability of crushing such prey which appears on the bottom of rivers and lakes. Thus, the intermediate nature of Oscar's pharyngeal jaw structure maximizes it utilization of varied food resources.

ON THE USE OF VARIOUS FISH AGEING METHODOLOGIES
Steven R. Hogler and Scott E. Belanger
2:15 Department of Biological Sciences
Bowling Green State University
Bowling Green, OH 43403

Recent investigations concerning estimating ages of fish have indicated that the precision and accuaracy of an estimate is a function of the method employed, water chemistry and the intensity of fishing pressure applied to a stock. Age estimations of white suckers (Catostomus commersoni) and freshwater drum (Aplodinotus grunniens) from the Maumee River, Ohio, were compared using pectoral fin-rays, dorsal fin-rays and scales. Estimates were not consistent between methods. Age estimations of walleyes (Stizostedion vitreum), taken from Burt Lake, Michigan, were compared using pectoral and pelvic fin-rays, dorsal fin-spines, otoliths and scales. Estimates were not significantly different ($p > .05$) except for the pelvic fin-ray and otolith combination ($p < .05$). Chemistry of the water body and fishing pressure should be evaluated prior to the employment of an ageing method. A subjective merit analysis of each method can be performed based upon the ease of application, distinctiveness and interpretability of annuli, and confidence in the age estimation. For Burt Lake walleye otoliths and pectoral fin-rays were given the highest rating and pelvic fin-rays were given the lowest rating. A second technique should be used as an occasional check for the reliablity of the chosen method.

THE EFFECT OF ASBESTOS ON LARVAL COHO SALMON by Scott E. Belanger and Karl Schurr
Department of Biological Sciences, Bowling Green State University, Bowling
2:30 Green, OH 43403

Asbestos is a naturally occurring, fibrous mineral with substantial deposits in North America. Through the processes of weathering and human activity, asbestos fibers are released into aquatic habitats. Asbestos poses a potentially major threat to aquatic life. In order to evaluate this threat, coho salmon larvae (Onchorhynchus kisutch) were chosen as an experimental model. Fertilized eggs obtained from the Platte River Fish Hatchery, Michigan, were incubated under standard laboratory conditions. Upon hatching, the larvae were divided into groups of control and experimental fish. The experimental population was exposed to concentrations of asbestos similar to those reported in the Great Lakes. The experiment was terminated after 40 days. Acute mortality was comparable for both groups. Control fish displayed normal behavior and physical development. Asbestos treated fish exhibited abnormal swimming behavior and developmental aberations such as distentions of the ceolomic cavity and gross tissue hypertrophy in the gill region. Cytological examination revealed extensive tissue hyperatrophy and distortion of the lateral line organ in experimental larvae. Asbestos fibers were present in many of the tissues of treated fish. Asbestos may represent a new environmental hazard whose effects on aquatic life must be further explored.

OBSERVATIONS ON THE SUMMER AVIFAUNA OCCUPYING HEMLOCK COMMUNITIES IN OHIO. Bruce Peterjohn. Division of Natural Areas and Preserves, Ohio Department of Natural
2:45 Resources, Fountain Square, Columbus, Ohio 43224.

During the summers of 1979 and 1980, I surveyed the summer avifauna in selected hemlock (Tsuga canadensis) dominated habitats in southern and eastern Ohio. In

addition to the more than 50 species that are widely distributed in Ohio, these habitats support a number of northern species that were previously considered to be very rare in the state. For example, solitary vireos (Vireo solitarius) and Canada warblers (Wilsonia canadensis) were found at 8 and 7 different locations, respectively. While only 1 or 2 pairs occupied most of these sites, up to 10 pairs were found at several northeastern Ohio locations and along the Mohican River. Other northern species observed during this survey include winter wren (Troglodytes troglodytes), hermit thrush (Catharus guttata), magnolia warbler (Dendroica magnolia), blackburnian warbler (D. fusca) and dark-eyed junco (Junco hyemalis). Most of these observations represent range extensions and population increases since the studies of Hicks (1935) and Trautman and Trautman (1968). Additional surveys of other hemlock dominated habitats are expected to uncover additional locations for these species and possibly other northern birds.

3:00 PROBLEMS IN THE DEVELOPMENT OF A BREEDING BIRD ATLAS FOR THE STATE OF OHIO. Daniel L. Rice, Division of Natural Areas and Preserves, Ohio Department of Natural Resources, Fountain Square, Columbus, Ohio 43224.

A 5-year breeding bird atlas is planned for initiation in the Spring of 1982 under the sponsorship of the Division of Natural Areas and Preserves. In this atlas project, the distribution of the breeding birds in Ohio will be determined by recording the occurrence of individual species within a series of geographical subunits or grids. The grid system being employed, one of the principle considerations in an atlas project, is based on the 7.5 minute topographic quadrangle system. Each topographic map is divided into 6 blocks of equal size to form the basic working units of the atlas. Due to the large number of blocks (over 4500) and the uneven distribution of Ohio's birders, it would be impossible to census every block in the time allowed. In order to solve this problem, 1 out of every 6 blocks in a quadrangle was chosen as a priority block for censusing. There are approximately 788 blocks which must be inventoried to successfully complete the atlas. Other problems considered in the development of Ohio's atlas include the inventory of significant habitats falling outside of the priority blocks, data collection on rare and endangered species, and the recruitment and organization of volunteer birders throughout Ohio.

3:15 SUNSET AS AN ORIENTATION CUE IN WHITE-THROATED SPARROWS. Christine Lucia and David R. Osborne, Department of Zoology, Miami University, Oxford, OH 45056.

The importance of sunset as a fall orientation cue in the White-throated Sparrow (Zonotrichia albicollis) was examined under clear skies, cloudy skies and no sunset exposure. Sparrows tested under clear skies exhibited a significant orientation southward. Those tested under cloudy skies exhibited a more dispersed orientation which was not significant. The orientation of sparrows when denied sunset was not significant and the amount of activity decreased. Results suggest sunset is a primary cue functioning in selection of direction prior to nocturnal fall migration. Secondary cues, possibly stars, may function in maintaining this direction.

3:30 FURTHER OBSERVATIONS ON BARN OWL PREY IN OHIO. Steven M. Takacs and E. Bruce McLean, Department of Biology, John Carroll University, University Heights, Ohio 44118.

In 1981, Colvin and McLean investigated Barn Owl (Tyto alba) prey and feeding selectivity in Ohio. They showed that of 18 prey species, four - Microtus pennsylvanicus, Blarina brevicauda, Zapus hudsonius, and Peromyscus spp. - constituted more than 93% of prey items taken by number at 5 sites. In this study, rather than comparing owls at 5 different sites, the owls, perhaps the same pair, at a single site were compared over two consecutive years, 1979 and 1980. The order and percentage by number of the top 4 prey items at this site were essentially the same over the 2 years. Percentages by biomass were also similar. Microtus pennsylvanicus, the number one prey item, comprised 54.96% of total prey by number in 1979; 54.90% in 1980. By biomass, the figures for Microtus were 64.02% and 64.38% for the 2 years. The number of prey items analyzed in 1979 was 1352; in 1980, 1756. Four new species were recorded for the site in 1980; three species recorded in 1979 were not taken in 1980. All seven of these species were represented at less than 1.0% of total prey items by number.

3:45 MEASUREMENT OF IRON ABSORPTION, TOTAL BODY IRON AND BODY IRON TURNOVER IN THE COMMON VAMPIRE BAT (DESMODUS ROTUNDUS). David Morton and Jeffrey T. Janning, Department of Biological Sciences, Wright State University, Dayton, Ohio 45435.

Vampire bats are the only obligate sanguivores among mammals. Their daily iron intake on a weight-to-weight basis is many times that of most other mammals. How the common vampire bat maintains iron balance on its high iron diet is the subject of the present study. Absorption of iron was measured in 6 bats with the double-isotope method and averaged (mean ± S.D.) 0.068 ± 0.032 %/day. Total body iron for 5 bats averaged 80 ± 67 mg/kg body weight. Body iron turnover equals $0.693/T_{1/2}$ of the clearance of radioiron from the blood after a single exponential rate of loss was established (Finch, et al. Proc. Soc. Exp. Biol. Med. 159: 335, 1978) and for 5 bats averaged 0.14 ± 0.04 %/day. The amount of iron absorbed by an average bat was estimated to be 4.2 µg/day and iron excreted, 4.6 µg/day, The common vampire bat maintains iron balance by severely limiting the percentage of iron absorbed from its blood meal.

ISOELECTRIC FOCUSING AND TWO-DIMENSIONAL ELECTROPHORESIS OF CAUDAL EPIDIDYMAL FLUID OF THE RAT. Robert B. Shabanowitz and Gary J. Killian, Kent State University, Department of Biological Sciences, Kent, Ohio 44242.

Isoelectric focusing (IEF) in polyacrylamide gels and two-dimensional SDS polyacrylamide gel electrophoresis (SDS-PAGE) were performed on fluid backflushed from the cauda epididymidis of Sprague-Dawley rats. IEF was performed in 3 x 70mm tube gels containing pH 3-10 and pH 3-7 ampholytes. SDS-PAGE was performed on the IEF gels using 7 x 8cm 10-22.5% concave gradient slabs. Electrophoresed gels were either stained for all proteins using Coomassie Blue-G or stained specifically for glycoproteins utilizing PAS techniques. IEF patterns revealed approximately thirty protein bands with up to fifteen being PAS positive. Six acidic bands were consistently prominent in several runs, one of these being highly PAS positive. The pH range of these predominant acidic bands was from 4.4-5.0. In the pH range 5.0-9.0 the protein bands were weakly stained and displayed run to run variation. These bands were rarely revealed in the second dimension, probably because of their low initial concentrations and subsequent losses during electrophoretic procedures. Second dimension SDS-PAGE was typified by a consistent pattern of six to eight protein spots. Several of these proteins were PAS positive and they were all less than 60,000 Daltons. These data demonstrate that the major proteins present in rat cauda epididymal fluid display characteristic IEF and two-dimensional banding patterns. The exact origin of these specific proteins is unknown; their apparent high concentration and consistent presence in the caudal fluid milieu may be indicative of a specific role in spermatozoan or epididymal physiology.

4:00 CHRISTMAS TREES, RODENT DAMAGE, AND HABITAT MANIPULATION. Bruce A. Colvin and William B. Jackson. Center for Environmental Research and Services, Bowling Green State University, Bowling Green, Ohio 43403.

Michigan Christmas tree (Scotch pine) production can be severely limited by meadow vole (Microtus pennsylvanicus) damage. Root as well as trunk girdling occurs, especially during winters with deep snow cover, and may result in major economic losses. Field investigations have determined that damage occurs predominantly to 5-7-year-old trees. By the fifth growth year, plant succession in plantations has resulted in the dense grass cover required by voles. The growth form of trees in these age classes provides suitable harborage under the spreading basal branches, which becomes critical to both vole survival and tree damage at times of heavy snow cover. Although the bases of trees in subsequent age classes are adequate to provide winter cover for voles, the larger tree size creates enough shading within plantations to reduce grass density and vole habitat. Use of acute toxicants before the fifth growth year is non-productive, but their later use in plantations with suitable grass cover is likely to be efficacious. An "apple index" can be utilized to determine vole population levels and the need for fall baiting. Field borders, typically with a dense grass mat, provide suitable environments for voles and corridors for vole movements and the opportunity to invade plantations at the proper growth stage. Managing these borders (i.e., mowing or discing, toxicant baiting) is recommended.

A. ZOOLOGY

SECOND AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 208

E. BRUCE MCLEAN, PRESIDING

1:30 BUSINESS MEETING

A COMPARISON OF CLEAR AND OPAQUE FUNNEL TRAPS FOR EMERGING INSECTS IN A SOUTHWESTERN OHIO POND. Paul M. Daniel, Kenneth Lynk and Marion Boesel. Department of Zoology, Miami University, Oxford, OH 45056.

2:00

Emergence traps have been used for many years for recording numbers and times of emergence of aquatic insects from ponds, lakes and reservoirs. Older traps were made of various metals and were opaque. Clear plastic is now available and is considered preferable. Four previously used .25 m^2 traps constructed of stainless steel and fitted with one quart Mason jars were paired with four newly constructed .1 m^2 cellulose acetate butyrate traps made from a template supplied by Rosenberg. Traps were placed at 1, 2, 3 and 4 meter depths in a pond on abandoned southwestern Ohio farmland. Traps were sampled for a six week period from late June to mid-August of 1981. Results obtained showed the clear traps yielded more insects/m^2 on 21 days on which traps were checked as compared with 9 days on which the opaque traps yielded more insects/m^2. In the early sampling period between June 30 and July 16 all four traps yielded more, however, in the July 16 to August 9 period the opaque traps produced a higher yield on 9 sampling dates and the clear traps produced a higher yield on 5 dates. This might be explained by the relatively high transparency as indicated by secchi disc readings of 3 meters at the beginning of the sampling period and the decrease in secchi disc readings to approximately 1.5 meters at the end of the sampling period. The advantages of the clear traps are demonstrated for relatively transparent waters but these advantages decrease in waters of increasing turbidity. The insects recovered from the trap were largely chironomidae represented by twenty seven species and ceratopogonidae represented by two species.

A GENERIC SYNOPSIS OF THE WORLD GYPONINAE. Dwight M. DeLong, Department of Entomology, Ohio State University, 1735 Neil Avenue, Columbus, Ohio 43210

2:15

So far as known, the Gyponinae occur only in North & South America and the adjacent islands. The Gyponinae are classified with the Iassinae and are dorsoventrally flattened leafhoppers with the ocelli on the crown. They are closely related to the Ledrinae from which they can be separated by the spination of the apex of the hind femur. The head may have a flat, produced crown with a thin, foliaceous margin, as in Hecalapona, or a short, narrow head with the crown rounding to front, without a definite margin, as in Scaris. The genitalia may vary from those with a very simple type of aedeagus to species with a more complicated type of structure, bearing a pair of aedeagal paraphyses. The Gyponinae is composed of some 43 described genera and some 900 known species. The largest number of described species are placed in the genera Gypona (158), Curtara (125) and Polana (117). There are 10 described genera which are monotypic, each with some bizarre of unique structure, like the venation in Freytagana. The Gyponinae can be divided into 2 rather equal groups on the basis of the type of genital structures. The aedeagus may be rather simple as in more primitive forms, such as Gypona, or quite complicated, as in Curtara, in which case the aedeagus bears paraphyses. Twenty-four described genera have a simple type of genitalia, without aedeagal paraphyses, 17 known genera have only paraphyses, and 2 genera have either condition, depending on the subgeneric classification.

LIFE CYCLE AND LARVAL STAGES OF THE BAT FLEA Myodopsylla insignis (SIPHONAPTERA: ISCHNOPSYLLIDAE). Stephen A. Smith and M.E. Clay, Dept. of Entomology, The Ohio State University, Columbus, OH 43210

2:30

Adult fleas were obtained from field-collected Little Brown Bats (Myotis lucifugus) and placed in glass vials where they deposited eggs. At a temperature of 29°C hatching occurred in five to six days. The three instars lasted a total of seven days, and the pupal stage lasted in a debris-covered silken cocoon for ten days, whereupon the adult flea emerged. Therefore, the complete life cycle of the bat flea in the laboratory took 23 days from oviposition to emergence, making it one of the shortest life cycles reported for a species of flea. All three larval stages were obtained in large numbers from freshly collected bat guano and preserved in 70% alcohol. Using the light microscope and the scanning electron microscope, specimens of all three instars were photographed and compared. Specimens for scanning electron microscopy were dehydrated in an increasing ethyl alcohol series, processed in a critical point dryer using CO_2, and then routinely mounted on studs. Characters of taxonomic importance are the chaetotaxy of the head and 13 body segments, the anal struts, the anal comb, the mandibles, and the maxillary palps. The first instar larvae are easily identified by the presence of a hatching spine on the posterodorsal surface of the head capsule. The integument of all three instars ranges from being finely sculptured to possessing numerous minute spines.

ECDYSONE 20-MONOOXYGENASE ACTIVITY DURING LARVAL-PUPAL DEVELOPMENT OF MANDUCA SEXTA. Stan Lee Smith. Bowling Green State University, Bowling Green, OH 43403.

2:45

Ecdysone 20-monooxygenase is the insect cytochrome P-450 enzyme system which converts ecdysone, the inactive secretory product of the prothoracic glands, to 20-hydroxyecdysone, the principal hemolymph ecdysteroid and physiologically active

form of the molting hormone. To determine if ecdysone 20-monooxygenase regulates the hemolymph ecdysteroid titer, as in vivo studies have suggested, the ecdysone 20-monooxygenase activities in fat body and midgut (the major metabolic tissues) were measured using an in vitro radioassay. Enzyme activities were measured at 12 to 24 hr intervals during the 10 day fifth instar larval-pharate pupal stadium of the tobacco hornworm, Manduca sexta. The hemolymph ecdysteroid titer was measured in the same animals using radioimmunoassay. Data from these studies reveal that both fat body and midgut monooxygenase activities exhibit a single major fluctuation during the stadium: fat body, a 3-fold fluctuation with peak activity on day 4; midgut, a 6-fold fluctuation with peak activity on day 5. The peak activities for fat body and midgut monooxygenases are temporally coincident and succedent, respectively, with the minor hemolymph ecdysteroid titer peak on day 4, the ecdysteroid peak responsible for larval-pupal reprogramming. In contrast, both tissue monooxygenase activities are at basal levels at the time of the major hemolymph ecdysteroid titer peak on day 7-8, the ecdysteroid peak responsible for the larval-pupal molt. Collectively, these data suggest that changes in ecdysone 20-monooxygenase activity do not contribute to the regulation of larval-pupal molting per se but may be involved in the regulation of larval-pupal reprogramming. Supported by NIH BRSP grant.

COMPARATIVE BIOLOGY OF THREE SPECIES OF ALGOVOROUS SCATELLA (DIPTERA: EPHYDRIDAE) OCCURRING IN SHORELINE HABITATS. **D. M. Blair, G. E. Klee, and B. A. Foote.**

3:00 Dept. Biol. Sci., Kent State Univ., Kent, OH 44240.

Resource partitioning along the temporal, trophic, and spatial axes was examined in S. obsoleta, S. quadrinotata, and S. stagnalis, three species of Ephydridae that are common in shoreline habitats in northeastern Ohio. There was nearly complete overlap temporally, considerable overlap trophically, but each species occurred in distinctly different habitats. Scatella obsoleta was found nearly exclusively on sandy shores, whereas S. quadrinotata was restricted to bedrock exposures along streams, and S. stagnalis was most abundant on muddy shores.

All three species are generalized grazers of algae. All three occur throughout the warm season and are multivoltine.

The life history of each species will be compared and contrasted, and the immature stages will be described and illustrated.

TIME-SEGREGATED MOSQUITO COLLECTIONS WITH A CDC MINIATURE LIGHT TRAP. Lee Mitchell, Toledo Area Sanitary District

3:15 5015 Stickney Avenue, Toledo, Ohio 43612

A modified CDC miniature light trap capable of segregating the mosquito collection according to interval is described. This trap has been used with a controlled carbon dioxide release system to measure the crepuscular and nocturnal activity of pest mosquitoes during the period May through September, 1980, in Lucas County, Ohio. Five Aedes species were found to be abundant and active during either the early evening hours or at sunset in a rural wooded habitat. Collections made at a stratification tower located in an urban wooded area indicated that Aedes vexans (Meigen) were more readily captured at ground level than at a high elevation; the converse was noted for Culex pipiens Linnaeus. The flight activity of Culex pipiens was found to be greatest after midnight at both trap elevations.

ACTIVITIES AND MOVEMENTS OF THE WESTERN SLENDER GLASS LIZARD (OPHISAURUS ATTENUATUS ATTENUATUS). David M. Morton, Dept. of Zool., Miami University, Oxford,

3:30 Ohio, 45056.

The activities and movements of the glass lizard were studied in outdoor pens using radioisotope tags to aid in location. The lizards were observed for 24 hour periods at the beginning and end of a seven day trial period. Environmental temperatures were monitored simultaneously with the behavioral observations. The lizards were surface active only during the day and early evening when the sruface temperature exceeded the subsurface temperature. A wide variety of environmental features were utilized as refuges and for cover. No preference was shown for burrowing. By combining attenuated body form, cryptic coloration, and the behavioral traits of refuge and cover utilization the glass lizard is able to maintain its activity over a wide range of environmental temperatures.

GROWTH AND MORTALITY OF LARVAL FRESHWATER DRUM (APLODINOTUS GRUNNIENS) IN THE MAUMEE RIVER ESTUARY. William S. Snyder. Center for Lake Erie Area Research, The

3:45 Ohio State University, 484 West 12th Avenue, Columbus, Ohio 43210.

Cumulative catch curve analysis was used in the determination of instantaneous growth and mortality rates for larval freshwater drum (Aplodinotus grunniens) in the lower Maumee River. Collections made at two sampling ranges indicated that two hatches had

occurred during the 1977 spawn. Ichthyoplankton populations were significantly affected by currents within the lower river, which is noted as being a freshwater estuary. Growth rates (G) calculated ranged from .03-.09. Mortality (Z) rates ranged from -.11 to -.33.

4:00 ICHTHYOPLANKTON DENSITIES AND GROWTH RATES AROUND LOCUST POINT, OHIO IN THE WESTERN BASIN OF LAKE ERIE - 1980. Theresa C. Gordon and Charles E. Herdendorf. Center for Lake Erie Area Research, The Ohio State University, 484 West 12th Avenue, Columbus, Ohio 43210.

Ichthyoplankton sampling was conducted between April and August, 1980 near Locust Point, Ohio in the western basin of Lake Erie. Surface and bottom samples were collected with a 0.75-m diameter oceanographic plankton net equipped with a flowmeter. The purpose of this investigation was to estimate growth rates, and to determine the densities and temporal distributions of abundant larval fish species.

Clupeids, freshwater drum, yellow perch and white bass composed approximately 75, 16, 6 and 2 percent, respectively, of the catch. Clupeids, yellow perch and white bass larvae first appeared in samples taken on May 9. Freshwater drum larvae first appeared in samples taken on June 6. Peak abundance of clupeids occurred on June 6 with an average density of 1,037 larvae per 100 m^3. Peak abundances of yellow perch occurred on May 23 with an average of 107 larvae per 100 m^3. Freshwater drum and white bass abundances peaked on June 27 with average densities of 1000/100 m^3 and 25/100 m^3, respectively. Growth rates were determined from length ranges of proto-, meso- and meta-larvae.

4:15 BEHAVIOR AS A REPRODUCTIVE ISOLATING MECHANISM BETWEEN SCHIZOCOSA ROVNERI, S. OCREATA AND THEIR HYBRIDS (ARANEAE;LYCOSIDAE). Gail E. Stratton, Dept. of Biological Sciences, University of Cincinnati, Cincinnati, OH 45221.

Courtship behavior in Schizocosa rovneri (Araneae; Lycosidae)is distinct from its co-occuring sibling species S. ocreata. In laboratory pairings, males of S.rovneri and S. occreata will court conspecific and heterospecific females with nearly equal frequency. However, females of both species show no receptivity to heterospecific males. Sexual communication via substratum coupled stridulation has been shown to be the critical factor in the reproductive isolation of these species. Heterospecific matings were achieved by anesthetizing the female and allowing a heterospecific male to court and copulate.These matings resulted in the production of viable hybrid offspring. Laboratory pairings have shown that male hybrids will court all females (hybrids and purebreds) with equal frequency. Hybrid females showed low overall response to all courting males. Females of S. ocreata and S. rovneri showed a significantly lower response to hybrid males when compared to purebred conspecific males. It is concluded that if hybrids could be produced in nature, they would be at a distinct disadvantage in not being able to reproduce because of behavioral barriers. It was demonstrated that both F_2 hybrids and backcrosses could be produced (through the forced mating technique).

B. PLANT SCIENCES

FIRST MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 212

WARREN A. WISTENDAHL, PRESIDING

8:30 DENSITY STRUCTURE OF ANNUAL AND PERENNIAL HERBS AROUND FLOODPLAIN TREES. E. Dennis Hardin and Warren A. Wistendahl, Department of Botany, Ohio University, Athens, OH 45701.

The mean number of stems of all species considered together is lower in quadrats on the downstream side of a floodplain tree than on the upstream side of a tree or in quadrats greater than 2.5 meters from the tree. The effect is most evident in quadrats immediately adjacent to the tree. Using repeated measures analysis, we show that the reduction in stems on the downstream side of the tree is due to the occurrence of significantly fewer stems of Laportea canadensis and Aster simplex, especially when these two rhizomatous perennials are considered together. The effect is reduced at 0.5 and 1.0 meters above the soil surface and is absent at 1.5 meters. Densities of stems of the species that spread mainly by seeds, the annual Impatiens pallida and the perennial Cryptotaenia canadensis, are not affected by the microtopographic feature except for a significant interaction for I. pallida between direction and distance from the tree at 1.5 meters above ground. The study illustrates the importance of a particular microtopographic feature in the horizontal and vertical structure of a floodplain community.

8:45 DEVELOPMENT OF A SPHAGNUM BOG IN A SANDSTONE QUARRY. Barbara K. Andreas, Division of Natural Areas and Preserves, ODNR, Columbus, Ohio 43224; Jay Abercrombie, USAMRDC, Fort Detrick, Frederick, Maryland 21701, and George E. Host, Dept. of Bio. Sci., Kent State University, Kent, Ohio 44242.

Bogs in glaciated areas commonly develop in kettle-hole depressions and lakes formed by ice activity. In less than 70 years a Sphagnum bog has formed in a sandstone quarry in an oak-hickory upland. In Silica Sand Quarry, Portage County, Ohio, a Sphagnum mat now measures 60 cm. in depth and approximately 0.75 km. diameter. Large cranberry (Vaccinium macrocarpon Ait.) is the dominant vascular plant and covers the mat and the surrounding sand substrate. Cranberry and Sphagnum apparently are advancing. An adjacent quarry, which is less than 40 years old and in the same rock system, was used for comparative studies. Analysis of the vascular plants, Sphagnum and other mosses, and measurements of basic water chemistry parameters indicate the formation of an ombrotrophic bog.

9:00 SCRUBBER WASTE AS AN AMENDMENT TO ACIDIC CLAY SOILS. George E. Host. Department of Biological Sciences, Kent State University, Kent, Ohio 44242.

The removal of sulfur dioxide from stack gasses of coal-burning power plants by the wet scrubber process produces a sludge comprised primarily of calcium sulfates, sulfites, and carbonates. This waste product appears to have a potential for use as an amendment to acidic clay-rich soils. As these soils are characteristic of abandoned strip-mine sites, the use of scrubber waste to reclaim stripped areas would not only permit the establishment of vegetational cover without the use of agricultural lime, but also alleviate the problem of scrubber waste disposal. Agricultural uses of scrubber waste are also under consideration.

A series of plots were established on a clay spoil area, pH 3.7, and amended with varying rates of scrubber waste, lime, and gypsum in a two-factor randomized block design. Avena sativa was sown in all plots and harvested after 10 weeks. Plant biomass and nutrient concentrations were analyzed for each treatment; soils were analyzed for pH, cation exchange capacity, and available nutrients. An analysis of variance of these variables indicates that rates of 10 to 30 tons/acre may be incorporated into acidic clay soils with statistically and biologically significant increases in pH, plant establishment and growth.

9:15 CELLULAR SLIME MOLDS OF OHIO. James C. Cavender, Botany Department, Ohio University, Athens, OH 45701.

A survey was made for cellular slime molds (Acrasiomycetes) in the soils of Ohio. It concentrates on forest soils where cellular slime mold diversity is greatest although some prairie remnants and agricultural soils are included. The first part of the survey was done in 1971-72 (Hopka and Cavender, Ohio Academy of Science, 1972) and the second part, which is reported here, in 1981-82. The major physiographic regions with their respective forest types were sampled: unglaciated plateau, till plain, glaciated plateau, blue grass and lake plain. Cellular slime mold distribution is reported in terms of densities, relative densities and frequencies of species. The relationship of species distribution to forest environment is discussed. A key to species and a description of species is included. One species is described as new and four species of a total of seventeen are considered rare. These are Dictyostelium aureum, D. septentrionalis, D. tenue and Polysphondylium filamentosum.

9:30 **VEGETATION INVENTORY: THE EDGE OF APPALACHIA PRESERVE SYSTEM, ADAMS COUNTY, OHIO.*** **Teresa Roberts, Botany Department, Miami University, Oxford, OH 45056.**

The Nature Conservancy of Ohio and the Cincinnati Museum of Natural History own a system of preserves in Adams County along the Ohio Brush Creek where the Appalachian Plateau and the Interior Low Plateau meet. Unique plant communities which correspond closely to the parent materials of dolomites and shales, range from prairie openings to Quercus prinus (Chestnut Oak) woods. During the summer of 1981 plant communities were observed in the field and mapped in the following preserves: Buzzardroost Rock, Red Rock, The Wilderness, Cave Hollow, Hanging Prairie, and Lynx Prairie. Topographic maps and aerial photographs were used to determine community boundaries. Species lists were compiled, with many unique species being noted. The plant community information presented provides a greater understanding of the ecology of the Edge of Appalachia Preserve System and addresses the need for future studies of plants, animals, and geology in this area.

* this work was conducted as a stewardship intern project for The Nature Conservancy, Ohio Chapter.

9:45 INVENTORY OF THE PRAIRIE OPENINGS OF THE EDGE OF APPALACHIA PRESERVE, ADAMS COUNTY, OHIO. Anne E. Annala and Lawrence A. Kapustka. Botany Department, Miami University, Oxford, OH 45056.

The holdings of the Nature Conservancy in Adams County, contain some of the more interesting vegetation assemblages in the state of Ohio. The prairie complexes within the preserves present questions with respect to their origin and success among the otherwise forested area. Because of the unique character of these prairies, the prospects for future plant ecological studies are excellent. Equally important, major questions concerning management and maintenance of these communities have been raised over the years. The paper presented here is designed to provide fundamental baseline information to meet the needs of future studies. Data was collected on the Adams County prairies during the 1981 growing season. The specific work conducted was: 1) to locate other prairie openings throughout the preserve system, 2) to prepare a series of maps charting the sizes of the prairie openings from aerial photos for the years 1938, 1950, 1965, and 1971, 3) to inventory plant species using non-destructive sampling and to construct a species list for each prairie opening, 4) to establish permanent stakes on each prairie opening in order to map the size and shape of the prairies and to establish permanent quadrat sampling stations, 5) and to develop a classification scheme and management recommendation for each of the prairies. Many of the species found are similar for most of the 18 prairies investigated. However, the 10 prairies in the Lynx Prairie Preserve seem to be the most diverse. All of the prairies have some degree of woody species invasion. The aerial photos reveal that the prairies were extensive in 1938 and have since decreased in size.

10:00 STATUS AND COUNTY DISTRIBUTION SUMMARY OF RARE OHIO VASCULAR PLANTS. Robert M. McCance, Jr., Division of Natural Areas and Preserves, Ohio Department of Natural Resources, Fountain Square, Columbus, Ohio 43224.

In July, 1980 the Ohio Division of Natural Areas and Preserves adopted the first official state list of 207 endangered and 210 threatened plants as part of the administrative rules implementing the "Ohio Endangered Plant Law," Ohio Revised Code Chapter 1518. In addition, 115 species were identified as presumed extirpated and 153 as potentially threatened for public education purposes. As a result of field investigations and literature review in 1980 and 1981, changes are being proposed to these official lists. The draft proposed changes, prior to the required public hearing, scheduled for February, 1982, would add 33 species to the endangered list and delete 37 from it. The proposed changes to the threatened list would add 40 species and delete 61. The potentially threatened list would increase from 153 to 193 species, and the presumed extirpated list would decrease from 115 to 96. The number of rare species per county ranges from 150 in Portage County to 1 in Paulding County, out of a state total of 585 species considered endangered, threatened and potentially threatened. Seven counties have over 100 rare species and 25 counties have fewer than 10. Approximately 6100 occurrences of these endangered, threatened and potentially threatened plants are listed in the Natural Heritage Program data base as of November 30, 1981.

10:15 THE NATIONAL HISTORICAL DISTRIBUTION OF PLATANTHERA PERAMOENA GRAY (ORCHIDACEAE). David M. Spooner and John Stephen Shelly. Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Columbus, Ohio, 43224. Department of Botany and Plant Pathology, Oregon State University, Corvallis, Oregon, 97331.

Attention has been focused on Platanthera peramoena (Purple Fringeless Orchid) since 1975 due to its formal notice of review as a potential candidate for federal threatened status. Various state agencies have been funded to study the status of this plant within their respective states. An updated county distribution map of P. peramoena was made utilizing recently acquired data from these agencies and from recent publications. The species is now historically documented for 200 counties throughout AL, AR, DE, IL, IN, KY, MD, MS, MO, NJ, NC, OH, PA, SC, TN, VA and WV. It is believed extirpated from DE, SC, and possibly NJ, and believed vulnerable in MD, AL, TN, PA, and VA. It is thought to be in less danger in other states, however, including OH. Recent manuals list the species for New York and Georgia. The New York references are in error and the Georgia record is also possibly in error. Historically P. peramoena is known from 20 Ohio counties. Since 1978, it has been located at 41 sites in 9 counties, but it is believed to exist in many of the others. Other than one 1896 record from Franklin County, and one 1906 record from Wayne County, all present and historical sites of this plant are limited to seasonally moist acidic soils of the Unglaciated Allegheny Plateau or the Illinoian Till Plain.

10:30 RARE PLANTS AND THE NATURAL AREA QUALITY OF WETLANDS ALONG TEAYS-STAGE VALLEYS IN SOUTHEASTERN OHIO. David M. Spooner, Ohio Department of Natural Resources, Division of Natural Areas & Preserves, Columbus, Ohio 43224.

A vegetational survey was conducted of Ohio wetlands along the drainage lines of the pre-glacial Marietta River, the main tributary of the Teays River in southeastern Ohio, and along other tributaries of the Teays River to the east of the present-day

Scioto River and south of the Marietta River drainage. These wetlands are underlain by a variety of poorly-drained sediments, including pre-Illinoian lake silts, Wisconsin lake silts and recent alluvium. A number of species rare to Ohio were found in these wetlands. They include Potamogeton pulcher, Potamogeton tennesseensis, Sagittaria australis, Carex straminea, Carex debilis var. debilis, Hypericum tubulosum, Utricularia gibba, Gratiola virginiana, and Gratiola viscidula var. shortii. The latter species is the most interesting of the above, as it appears to be confined to these wetlands in southeastern Ohio and adjacent Kentucky and West Virginia. It is now documented for 35 localities in Gallia, Jackson, and Pike counties. In Ohio, none of these wetlands exist in their natural state. They are subject to a variety of destructive influences, including filling, draining and pollution from strip mines. While all have been modified to some degree, a few remain that are of natural area quality.

10:45 **PATTERNS OF FOREST FLOOR HETEROGENEITY AND UNDERSTORY HERB DISTRIBUTION IN A MIXED MESOPHYTIC FOREST.** Carl R. Crozier and R.E.J.Boerner, Department of Botany, The Ohio State University, Columbus, Ohio 43210.

Distributions of understory herbs were examined in a mixed mesophytic forest in Neotoma Valley, Hocking Co., Ohio. Since the area has a low frequency of treefalls, pits, mounds, and rock outcrops, we hypothesized that forest floor heterogeneity due to variations in light intensity, litter depth, soil moisture, and/or soil nutrient levels, may be a major factor in the distributions of these herbs. A potential factor in establishing soil moisture and nutrient gradients is stemflow. Therefore, variations in the forest floor conditions may be correlated with the proximity to a tree base, and with the factors that influence the distribution and volume of stemflow, such as compass direction relative to prevailing winds, bark texture, and branching patterns. The results of a mapping study of twenty-six herb species in plots established around individuals of different canopy tree species and in plots not associated with canopy trees will be presented. Data from spring 1981 revealed a number of species (Adiantum pedatum, Anemonella thalictroides, Claytonia virginica, Geranium maculatum, Polygonatum biflorum, Trillium grandiflorum, Uvularia grandiflora, Viola pubescens, and Viola triloba) which displayed non-random distribution patterns. These patterns of herb distribution will be compared to and correlated with variations in spring light intensity, litter depth, soil moisture, and stemflow volumes.

B. PLANT SCIENCES

SECOND MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 213

IRWIN A. UNGAR, PRESIDING

8:30 ENERGY SOURCES INVOLVED IN THE RECOVERY OF N_2ASE ACTIVITY FROM FREEZING BY TERRESTRIAL NOSTOC sp. John D. DuBois and Lawrence A. Kapustka. Botany Department, Miami University, Oxford, Ohio 45056.

We have demonstrated that colonies of terrestrial Nostoc sp. can recover N_2ase activity quickly following a freeze period. The objective of this study was to assess the involvement of various energy sources in the recovery of N_2ase activity. Nostoc sp. colonies, growing in 30 ml Wheaton serum bottles on silica sand with aqueous N-free Allen's medium were pretreated (prior to freezing) with 3 days of exposure to light or complete darkness. Cultures were then frozen (-12 C) for 3-5 days. Upon thawing, cultures were exposed to either light or darkness alone or along with the addition of a metabolic inhibitor. Photosynthetic activity was uncoupled using 10^{-5} M 3(3,4-dichlorophenyl)-1,1-dimethyl urea (DCMU). An inhibitor of aconitate hydratase, 10^{-3} M Monofluoroacetate (MFA), was used to inhibit energy flow via Krebs cycle activity. In certain instances, colonies were also exposed to an artificial ATP generating system using ATP, MgCl, phosphocreatine, and creatine phosphokinase. An external reductant source was supplied by adding $Na_2S_2O_4$. N_2ase activity was monitored for 96 hrs following thawing using one hour acetylene reduction assays. Results indicate that the complete recovery of N_2ase activity is dependent on the recovery of photosynthetic activity. Energy via Krebs cycle activity in the dark can support some N_2ase activity within the first 24 hrs. N_2ase activity in the dark using energy from this source peaks at 12 hrs and appears to be dependent on the ability of the Nostoc sp. to store photosynthate prior to freezing.

8:45 WATER RELATIONS IN SOME HALOPHYTES FROM AN OHIO INLAND SALT MARSH. Seyed Hamid Karimi and Irwin A. Ungar. Department of Botany, Ohio University, Athens, Ohio 45701.

It is necessary for the plants growing in saline environments to maintain a more negative osmotic potential than that of the medium. This hypothesis is

confirmed by the measurements of osmotic potential in Atriplex triangularis, Salicornia europaea and Spergularia marina throughout their growth period in the field. Xylem pressure potential also demonstrates a clear relationship between the plant and the water potential of the medium. Root xylem pressure potential was always lower than that of the plant osmotic potential. The data obtained in the laboratory corroborates the findings in the field.

9:00 ELECTRON MICROSCOPE OBSERVATIONS ON MITOSIS IN BREVILEGNIA LINEARIS. Cynthia A. Wagner and Charles E. Miller, Department of Botany, Ohio University, Athens, Ohio 45701

The saprolegniaceous fungus Brevilegnia linearis Coker and Couch was isolated from soil collected from Timrod Park, Florence, S. C. in March 1981. Hemp seed cultures were grown axenically in Emerson water at 17°C. Cultures were fixed at 24 hr intervals in glutaraldehyde, postfixed in osmium tetroxide, and embedded in an Araldite-Epon mixture. Thin sections were stained with aqueous uranyl acetate and lead citrate. Nuclei in the hyphae of 10-day old material were found in stages of division. Preliminary observations indicate mitosis in B. linearis is characterized by a persistent, intact nuclear envelope, a persistent nucleolus, and the absence of a metaphase plate. Paired centrioles are aligned at approximately 180° end to end and lie adjacent to a portion of the nuclear envelope seemingly differentiated by increased electron density of the membranes. Spindle microtubules appear to develop from this electron dense area. These features are similar to characteristics of mitosis found in other members of the Saprolegniaceae.

9:15 LIFE CYCLE STUDIES ON OLPIDIOPSIS VARIANS SHANOR (OLPIDIOPSIDACAEAE) INFECTING APLANOPSIS TERRESTRIS HOHNK (SAPROLEGNIACEAE). I. ULTRASTRUCTURE OF SPORANGIAL FORMATION. R. W. Martin and C. E. Miller. Department of Botany, Ohio University, Athens, Ohio 45701.

The holocarpic, endo-parasite Olpidiopsis varians infecting Aplanopsis terrstris was collected from soil in Mahoning County, Ohio. Host and parasite are maintained together in two-member axenic culture on 1/10 Emerson YPss agar (Held, 1972) as well as bifungal water culture with host grown on sesame seed. Fungal material for electron microscopy was fixed at timed intervals in 2% glutaraldehyde, post-fixed in 1% OsO_4 in phosphate buffer, dehydrated in a graded series of ETOH and propylene oxide, and embedded in Spurrs resin. Thin sections were post stained in either aqueous uranyl acetate and lead citrate or aqueous $KMnO_4$. Results indicate that the unicellular parasite causes hypertrophy to growing hyphal tips of the water mold host. In the sporogenous phase (0-72 h after infection) primary sporangia are produced in the host hypertrophy and are often accompanied by smaller parasite thalli. Sporangial formation is typified by increased growth and an increase in the number of nuclei through mitosis. Prior to zoospore cleavage the sporangium produces many large vacuoles which are formed towards the center of the ellipsoid thallus. The cytoplasm of the primary sporangium of O. varians possess nuclei (with associated centrioles and microtubules at mitosis), oomycete-like mitochondria, vacuoles, and numerous lipid bodies. A possible host cytoplasmic response to infection is also documented.

9:30 ACID PRECIPITATION AND ITS EFFECTS ON NODULATION AND NITROGEN FIXATION IN GLYCINE MAX. Linda C. Noll and Lawrence A. Kapustka. Department of Botany, Miami University, Oxford, Ohio 45056.

The pH of naturally occurring rainwater is 5.6 due to the formation of carbonic acid that occurs when CO_2 is in equilibrium with precipitation. The problem of acid precipitation, where the pH of precipitation is lowered by the increased concentration of sulfuric and nitric acids formed by the reaction of water with sulfur and nitrogen oxides emitted from the combustion of fossil fuels, has become a significant problem in the United States. Reduction of agricultural yields is one potential problem of acid precipitation.

The effect of acid precipitation on the N_2-fixing activity of soybean nodules was studied under laboratory conditions. Glycine max var. Wayne plants were grown in Seed-Pack growth pouches initially containing 10 ml of nitrogen-free Hoagland's solution and 10 ml of soil extract solution made from soybean field soil. Plants were grown in a growth chamber and watered on a regular basis with a synthetic rain solution acidified with sulfuric acid to pH 3.0, 4.0, and 5.6. Observations of nodule size and numbers, and plant growth was measured on a biweekly basis. N_2-fixing activity was assessed using the acetylene reduction technique.

Preliminary data show no difference in N_2-fixing activity between pH 4.0 and control (pH 5.6). At pH 3.0, the N_2-fixing activity had been decreased. This decrease in N_2-fixing activity due to acid precipitation results in a decline in plant growth and hence a reduction in crop yield.

9:45 INFLUENCE OF XYLOSE ON SPORULATION OF BIPOLARIS MAYDIS RACE T AND ON pH AND AMMONIUM LEVELS. Timothy W. Bischoff and M. O. Garraway. Department of Plant Pathology, The Ohio State University, Columbus, OH 43210 and Ohio Agricultural Research and Development Center, Wooster, OH 44691

Sporulation of Bipolaris maydis race T on a standard medium containing 10.0 g D-glucose, 4.0 g L-asparagine, 1.5 g KH_2PO_4, 0.75 g $MgSO_4.7H_2O$, 0.1 mg each of $CuSO_4$, $Fe_2(SO_4)_3$, $MnSO_4$, $ZnSO_4$ and 20 g agar per liter of distilled water was compared with that on a similar medium supplemented with 2.0 g/liter D-xylose. After 6 days of incubation in the dark at 28°C sporulation per mg dry wt of fungal mycelia, was 50% higher on a xylose-supplemented medium than on a non-supplemented one. In contrast, the increment in pH of cultures on a xylose-supplemented medium was 50% less than that on a medium without xylose. The Nessler colorimetric test was used to measure residual ammonium ion (NH_4^+) in culture filtrates, and NH_4^+ generated from L-asparagine by homogenates of mycelia grown on supplemented and non-supplemented media. Washed homogenates from mycelia on a non-supplemented medium generated NH_4^+ at a comparable rate to that from mycelia on a xylose-supplemented one. But, the concentration of residual NH_4^+ which accumulated after 6 days of growth on a non-supplemented medium was 4-fold that on one supplemented with xylose. These data may explain trends in sporulation and media pH seen in response to a xylose supplement to a glucose medium, when L-asparagine is the nitrogen source used for growth of B. maydis race T.

10:00 EFFECT OF GRAVITY ON APICAL DOMINANCE. Morris G. Cline, Department of Botany, Ohio State University, Columbus, Ohio 43210.

That apical dominance in Pharbitis nil (Japanese Morning Glory) is significantly affected by gravity can be demonstrated either by positioning the plant horizontally, in which case random sprouting of lateral buds occurs, or by inverting the plant, in which case sprouting of a lateral bud near the base of the stem occurs with a simultaneous decrease of terminal bud elongation. Recently it has been found that apical dominance in Pharbitis can be released by gently inverting the upper portion of the shoot so that the terminal bud is lowered at least 15-20 cm below the bend in the stem. Vigorous outgrowth of the highest lateral bud (HLB) begins within two or three days following the inversion of the shoot. That gravity is the cause of this release of apical dominance is suggested by the fact that sprouting in the HLB does not occur (1) when the entire plant (with the upper portion of the shoot inverted) is turned upside down and (2) when the upper portion of the shoot is positioned in a small loop with the terminal bud situated upward just above the loop. The interaction between gravity and auxin effects on apical dominance will also be discussed.

10:15 WOMEN'S ROLE IN THE DEVELOPMENT OF NINETEENTH CENTURY AMERICAN BOTANY. Emanuel D. Rudolph, Department of Botany, The Ohio State University, 1735 Neil Ave., Columbus, OH 43210

The discipline of botany was very much aided in America in its development during the Nineteenth Century by the activities of numerous women. In an analysis of nearly 1200 women, I show that, although they were seldom professional botanists, these women made substantial contributions to botany, particularly after the Civil War, by making valuable plant collections, by writing popular books and helping to run various botanical clubs. Most of the women resided in the Northeastern States, and most of their activities were made in the last decade of the Century. The few professional women botanists played a notable role in education particularly in women's colleges.

10:30 VEGETATION OF "NEGRO ISLAND", HARDIN COUNTY OHIO

Mr. Roy Snyder
Biology Department
The Ohio State University
4240 Campus Drive
Lima, OH 45804

The area concerned in this study is bound on the south by Ohio State Route 67, on the west by McDonald Township 55, on the north by Hardin County 150, and on the east by McDonald Township 65. The vegetation of the area is composed of five forest types. Beech-maple association, oak-hickory association, swamp forest association, aquatic and bog types, and old field association. Eighty-six families, 217 genera, and 291 species, varieties and forms are listed on collections made by the writer in the period 1956 through 1981.

10:45 STRUCTURE OF THE ECTOMYCORRHIZAE OF PINUS SYLVESTRIS AND A BASIDIOMYCETE SUILLUS VARIEGATUS. Robert D. Warmbrodt. Department of Botany, The Ohio State University, 1735 Neil Avenue, Columbus, Ohio 43210.

Seedlings of Pinus sylvestris growing in sterile soil or vermiculite were inoculated with Suillus variegatus in order to obtain mycorrhizae in pure culture. Following mycorrhizal development, three regions of the mycorrhizal rootlets (the mantle, the tannin layer, and the Hartig net) were studied with light and transmission electron microscopes. The mantle consisted of several layers of relatively compact fungal hyphae with dolopore septae. The cytoplasm of the fungal cells contained components typical of basidiomycetes. Glycogen was the primary storage product. The tannin layer consisted of 1-2 layers of cells that were filled with an electron dense material believed to be polyphenolic deposits. All of the host cells in the tannin layer appeared dead. In the Hartig net region the fungal hyphae were wholly confined to the intercellular spaces and did not penetrate the endodermis or vascular cylinder. The fungal cells were similar in structure to the cells in the mantle region. Each host cell in the Hartig net had a large nucleus and a thin layer of cytoplasm surrounding a large central vacuole. The cytoplasm contained components typical of the cortical cells in uninfected P. sylvestris roots. Contrary to reports on other ectomycorrhizae, starch grains were frequently observed in the plastids in this region.

These results will be discussed in relation to the results of transport studies involving ^{14}C-labelled compounds in the mycorrhizae.

B. PLANT SCIENCES

FIRST AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 212

GAR W. ROTHWELL, PRESIDING

1:30 BUSINESS MEETING

1:45 STUDIES OF SEED FERN POLLEN: DEVELOPMENT OF THE EXINE IN MONOLETES (MEDULLOSALES). Thomas N. Taylor and Gar W. Rothwell. Department of Botany, The Ohio State University, Columbus, Ohio 43210 and Department of Botany, Ohio University, Athens, Ohio 45701.

Monoletes pollen extracted from the seed fern synangium Dolerotheca sclerotica Baxter illustrate four stages in the development of the sporoderm. In the first stage the grains are up to 100 μm long and possess an apparent homogeneous exine in which there is little differentiation between the nexine and sexine. Numerous nexine lamellae and the initiation of sexine expansion mark stage 2 in exine ontogeny. Further expansion of the sexine continues in the third stage until the ratio between the nexine and sexine is approximately 1:5. The final stage in maturation of the sporoderm shows an expanded alveolate sexine with some of the sporopollenin units broken and disorganized. It is at this stage of development that nexine lamellae are most prominent. The formation of sporoderm layers in the fossil grains is compared with pollen grain development in living cycads (Cycadophyta) and a model proposed to account for the apparent early formation of nexine lamellae in Monoletes. The evolution of exine components in early pollen types is discussed.

2:00 VEGETATIVE AND FERTILE STRUCTURES OF CYATHOTHECA TAYLOR FROM THE UPPER PENNSYLVANIAN APPALACHIAN BASIN. James E. Mickle* and Gar Rothwell. Department of Botany, Ohio University, Athens, Ohio 45701

Stems and leaves associated with a fertile structure referable to Cyathotheca Taylor are described from coal balls recovered from the Late Pennsylvanian Duquesne Coal of eastern Ohio. Stems are up to 5.0 mm in diameter and have tangentially elongate primary xylem strands surrounding a pith. Primary xylem is apparently endarch, and tracheids are scalariform. Secondary xylem is present and consists of tracheids with oval-bordered pitting and narrow, parenchymatous rays 1-2 cells high and 1 cell wide. Cortex contains numerous dark resinous bodies. Leaves are borne helically, and are small, pinnate and vascularized by a single U-shaped bundle. Pinnules possess a single terete bundle in the midrib. Vegetative parts are referred to the fertile fragments based upon close association, similarity of vascular morphology and common histological features. The fertile specimen consists of sporangia 0.6-0.7 mm in diameter attached laterally to approximately 10 laminar segments by long, vascularized pedicels. Laminar segments may dichotomize, and arise from a single terete stalk which is protostelic at

the base and has dark, resinous bodies in the cortex. Distally the stalk has a pith, and the trace divides into about 6 segments. Spores average 36 µm in diameter and are of the Kewaneesporites type. Structures described here are compared to those of pteridophytes, seed ferns and other gymnosperms. The known features of Cyathotheca do not conform closely to any currently recognized major group of vascular plants.

2:15 STRUCTURE AND REPRODUCTIVE BIOLOGY OF MAZOCARPON FROM THE UPPER PENNSYLVANIAN APPALACHIAN BASIN. Kathleen B. Pigg. Department of Botany, Ohio University, Athens, Ohio 45701

Specimens of Mazocarpon, the anatomically preserved cone of Sigillaria, have recently been discovered in coal balls from the Upper Pennsylvanian Duquesne coal of Ohio. Both micro- and megasporangiate cones have sporophylls borne in a tight helix, and exhibit typical sigillarian stelar anatomy. Microsporangiate cones are approximately 3.5 X 0.5 cm and contain numerous spores of the Crassispora type. Megasporangiate cones measure up to 6 cm long and are either devoid of contents or contain immature megaspores embedded in parenchymatous tissue. Additional fragments of megasporangia and isolated megaspores are dispersed throughout the coal-ball matrix. Up to four megaspores have been found within isolated sporangial fragments. Megaspores are rounded to concavo-convex, measure up to 2 mm across, and are assignable to Laevigatisporites. Megaspores are smooth-walled, with remnants of torn parenchymatous tissue adhering to the exine. Some isolated megaspores contain cellular megagametophytes with prominent rhizoids. The known morphological features of these specimens differ from those of all previously described Mazocarpon species, and allow us to recognize a greater diversity in the reproductive biology of sigillarian lycopsids.

2:30 RECONSTRUCTION OF A MEDULLOSAN FROND FROM THE UPPER PENNSYLVANIAN OF THE APPALACHIAN BASIN. Hazel E. Beeler, Department of Botany, Ohio University, Athens, OH 45701.

A complete medullosan frond has been reconstructed based on a large number of permineralized Myeloxylon-Neuropteris-Mixoneura-Cyclopteris fragments from the same outcrop of the late Pennsylvanian Duquesne Coal near Steubenville, Ohio. Individual fragments exhibit up to three orders of branching and show intergrading size ranges, branching patterns and anatomical features. Distinctive characteristics include thin spots in the "sparganum" of rachises and primary pinnae, which are sites of attachment of vascularized emergences. Tertiary pinnae, which are anatomically identical to vascularized emergences and sometimes recurved, occur on secondary pinnae. This assemblage includes by far the most common types of frond members in the Steubenville flora. Pinna rachises of Neuropteris pinnules are identical in vascular configuration to tertiary pinnae of Myeloxylon frond members. Based on the close association and similar structure, these frond parts and pinnules are interpreted as representing fragments of the same type of frond. Similar anatomical features of the different pinnule types support this interpretation. Fronds displaying comparable features are known from compression material.

2:45 THE ORGANIZATION AND REPRODUCTIVE BIOLOGY OF CERTAIN EARLY CONIFER POLLEN CONES. Gene Mapes, Botany Department, Ohio University, Athens, Ohio 45701.

Anatomically preserved conifer pollen cones have been recovered from shaley limestone layers at Hamilton quarry in southeastern Kansas. Developmental studies reveal a range of ontogenetic variation from unexpanded buds to mature cones with dehisced pollen sacs. Comparison of cuticular features with details of anatomy and morphology suggest several species of voltzialean conifers can be recognized from this unusually rich assemblage of Upper Paleozoic conifer remains.

3:00 SECONDARY ZOOSPORE FORMATION IN SORODISCUS COKERI (PLASMODIOPHORACEAE). Russell K. Robbins and Charles E. Miller, Ohio University, Department of Botany, Athens, Ohio 45701.

Sorodiscus cokeri is a holocarpic, endobiotic, obligate parasite of species of Pythium. The life cycle of S. cokeri consists of two major phases, a cystogenous phase and a sporangiogenous phase. Transmission electron microscopy was used to study morphological changes during development of zoospores from sporangiogenous plasmodia. Young plasmodia are separated from host cytoplasm by a thick electron-dense membrane, and contain a standard complement of cellular organelles. Electron-dense sheets of membrane appear throughout each plasmodium isolating groups of nuclei into the incipient lobes of the sporangium. The cytoplasm in each lobe further differentiates into secondary zoospores. The mature secondary zoospores are amoeboid-like in shape with two heterocont flagella. These developmental events will be discussed with reference to the life cycles of other Plasmodiophoromycetes.

3:15 THE PLASMODIOPHORID PARASITIC ON HETERANTHERA DUBIA. James P. Braselton, Department of Botany, Ohio University, Athens, OH 45701.

Members of the Plasmodiophorales are obligate, intracellular parasites on a variety of vascular plants, algae, and fungi. The member of the order that causes hypertrophy of roots of Heteranthera dubia (Jacques) MacM. has been assigned by previous investigators to either Membranosorus Ostenfeld and Peterson or Sorodiscus Lagerheim and Winge. In this study light and electron microscopic observations of cystogenous plasmodia and resting spores (cysts) indicate that the organism should be classified in the genus Membranosorus. Ultrastructural features include centrioles paired end-to-end in plasmodia, but occurring singularly in resting spores; and crystals in resting spores. Nuclear divisions in mature plasmodia are interpreted as meiotic because of the presence of synaptonemal complexes. Supported in part by NSF (PCM-8113631).

3:30 ULTRASTRUCTURAL STUDIES ON THE BIFLAGELLATE MOTILE CELL OF CODIUM FRAGILE SSP. TOMENTOSOIDES (CAULERPALES, CHLOROPHYTA). Brian T. Greuel, Gary L. Floyd, and Charles J. O'Kelly. Department of Botany, Ohio State University, Columbus 43210.

The coenocytic green alga Codium fragile ssp. tomentosoides reproduces by biflagellate motile cells produced in specialized sporangia. Unlike other members of the Caulerpales, in which biflagellate cells function as gametes, the motile cells of C. fragile tomentosoides function as zoospores, germinating directly to give rise to new plants. Ultrastructurally, these swarmers are very similar to female gametes of the previously examined Caulerpalean genera Bryopsis, Caulerpa, Derbesia, and Pseudobryopsis. Shared features include a modified, Ulvophycean, distal connecting fiber, overlapping proximal ends of the basal bodies, septations in the β-microtubules of flagella and basal bodies, and cruciate flagellar rootlets composed of winged microtubules. A network of fine fibers descends from the region of each basal body and attaches to a semicircular band of electron-dense material that is appressed to the anteriormost end of the nucleus. Irregularly-shaped, electron-dense masses are scattered throughout the network of fibers. Female gametes of other Caulerpalean genera possess structures analogous to this fibrous network-band complex. These shared features support the close taxonomic placement of Codium with the other Caulerpalean genera investigated, and the referral of the Caulerpales to the Ulvophyceae. The biflagellate swarmer of C. fragile tomentosoides seems to be descended from a female gamete that has undergone a change in function without major changes in structure.

3:45 FINE STRUCTURAL STUDIES ON THE QUADRIFLAGELLATE ZOOSPORES OF AN ENTEROMORPHA SPECIES (ULVACEAE, CHLOROPHYTA) COLLECTED IN FRESH WATER. Carol L. Stuessy, Gary L. Floyd, and Charles J. O'Kelly. Department of Botany, Ohio State University, Columbus 43210.

Most members of the green algal family Ulvaceae are marine organisms, but a few species have wide salinity tolerances and are known to occur in fresh water. The zoospores of Enteromorpha cf. intestinalis collected from a fresh-water pond in Wyoming do not, however, differ ultrastructurally from those of previously investigated marine specimens of Enteromorpha and Ulva. This underscores their close relationship. Similar features include the absence of flagellar and body scales, four basal bodies linked by a distal connecting fiber ("capping plate"), septations in the β microtubules of the flagella and basal bodies, cruciate microtubular rootlets showing an alternation of 3/1 and 2-membered rootlets, striated microtubular associated components (SMACs) accompanying the 2-membered rootlets, four rhizoplasts, each underlying a microtubular rootlet, and terminal caps. The basal bodies are arranged in two pairs, an upper and a lower, and the proximal ends of the upper basal body pair overlap. The terminal cap on each upper basal body completely overlaps the proximal end and has a two-part structure. These latter three features are newly described for Ulvacean zoospores, but are probably of general occurrence.

4:00 THE EARLIEST-KNOWN ARTHROPOD BURROWS IN FOSSIL WOOD. Michael A. Cichan and Thomas N. Taylor. Department of Botany, The Ohio State University, Columbus, OH 43210.

A complex system of anastomosing burrows is described from structurally preserved Lower-Middle Pennsylvanian Premnoxylon wood. The burrows are filled with small uniformly shaped coprolites. In addition, poorly preserved tubular structures within the wood are described which may represent the remains of the organisms that produced the burrows. Although a definitive statement cannot be made regarding the specific type of organism that formed the galleries, the size of the bore holes, their general orientation, and the presence of fecal material indicate that the burrows were produced by wood-boring arthropods. This discovery represents the oldest recorded evidence for the existence of wood-boring organisms, and indicates that a relatively specialized form of animal-plant interaction was present during the Paleozoic.

4:15 STUDIES OF FOSSIL FUNGI: AN ANALYSIS OF TRAQUAIRIA. Sara P. Stubblefield and Thomas N. Taylor. Department of Botany, The Ohio State University, Columbus, Ohio 43210.

Traquairia is one of several genera of problematic microfossils traditionally referred to as sporocarps. It has been known from Carboniferous localities in Europe for over 100 years, but has only recently been recognized from North America. Traquairia is examined from Pennsylvanian age coal balls collected at Lewis Creek, Kentucky and West Mineral, Kansas. The material is compared with specimens from Burnley, Lancashire, England, as well as with specimens from Arma, Kansas which had been mistakenly assigned to Mycocarpon. The use of scanning electron microscopy has clarified the organization of Traquairia. Specimens are spherical and approximately 450 μm in diameter. Each possesses a two-layered wall which encloses a hollow cavity. The outer layer is composed of extensively branched, interlaced tubes, some of which are prolonged into spines. The inner wall is thinner, smooth, and non-tubular. Spherical bodies approximately 35 μm in diameter may be present within the central cavity. The affinities of Traquairia have always been unclear. Most workers have considered it to be an extinct radiolarian-like protozoan, although some have argued that it is a plant structure. Similar taxa are usually assumed to be fungal. After comparison with other organisms, it is clear that Traquairia differs from anything living today. It is our opinion that this Paleozoic fossil is most similar to Ascomycete fruiting structures such as those found among the Eurotiales or Erysiphales.

4:30 AN OPAL PHYTOLITH AND PALYNOMORPH STUDY OF EXTANT AND FOSSIL SOILS IN KANSAS. Marie H. Kurmann, Department of Botany, The Ohio State University, Columbus, Ohio 43210

Soils from three plant communities (shortgrass prairie, tallgrass prairie and a deciduous forest) were analyzed for opal phytoliths, pollen grains and fungal spores. These data were used to correlate vegetation type with phytolith and palynomorph deposition. The results were applied to the study of a paleosol to determine the vegetation and ecological conditions prior to burial. Light microscopy and scanning electron microscopy were used to elucidate the different forms of phytoliths, pollen grains and fungal spores. Statistical analyses of the data showed that the phytolith composition differs significantly among the three extant soils. Pollen analysis failed to differentiate between tallgrass and shortgrass prairie, because the pollen could not be attributed accurately to the different grass taxa that are characteristic of these vegetation types. However, pollen analysis distinguished woodland sites from the prairies because of the abundance of easily recognized pollen of woody plants. The comparison of the extant soils to the paleosol showed that the plant community prior to burial may have been a cool season grassland. The results demonstrate the importance of combined phytolith and pollen analysis, because phytoliths provide additional, refined botanical data not available in pollen studies, especially in grasslands.

4:45 FILAMENTOUS BACTERIA FROM THE PENNSYLVANIAN OF NORTH AMERICA. Edith L. Smoot and Thomas N. Taylor, Department of Botany, The Ohio State University, Columbus, OH 43210.

Actinomycetes, or filamentous bacteria, have been found within the phloem cells of Botryopteris petioles, collected at the Lewis Creek, Kentucky coal ball locality. The bacterial filaments are restricted to the large-diameter, mucilage cells within the phloem zone. The filaments range from 0.5 μm to 2.0 μm in diameter, but most commonly are around 1.0 μm in diameter, and generally exhibit a somewhat knobby or bead-like appearance. This morphology is typical of extant actinomycetes, and results from the break up of the filament into individual bacterial cells. In addition to filamentous structures, spherical objects have also been observed within the phloem cells. These are usually about 2.0 μm in diameter, and probably represent so-called "conidia" which are formed as the filaments fragment. This interpretation is supported by their restricted occurrence within the mucilage cells of the phloem, and by their consistent size (ranging from 0.5 up to 2.0 μm in diameter). Comparison is made with other fossil forms as well as with living types.

B. PLANT SCIENCES

SECOND AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 213

GARY L. FLOYD, PRESIDING

1:30 BUSINESS MEETING, DENNEY HALL 212

BOTANICAL CONTRIBUTIONS BY WOMEN IN OHIO. Ronald L. Stuckey, Department of Botany, The Ohio State University, 1735 Neil Ave, Columbus, Ohio 43210.

1:45 Women have had a part in the development of the botanical heritage of Ohio. As early as the 1840's Eliza G. Wheeler, wife of William S. Sullivant and nineteenth century world authority on bryology, was his co-laborer in the preparation of descriptions and illustrations of mosses and liverworts. Rachel L. Bodley, a pioneer in the professional education of women, held a professorship of natural sciences in the Cincinnati Female Seminary in the early 1860's and prepared a Catalogue (1865) of the extensive herbarium of Joseph Clark, the first local flora of Ohio prepared by a woman. With the establishment of the Department of Botany and the State Herbarium at The Ohio State University in the 1890's and under the direction of William A. Kellerman and John H. Schaffner, women were a contributing part of the program. Their wives, Stella Kellerman and Mabel Schaffner, published papers in the disciplines of floristics and morphology . Prior to 1900, several women each contributed over 100 specimens of plants to the State Herbarium. At least 25 women students conducted research under Schaffner and published papers on embryological life histories, classifications based on vegetative morphological features, and taxonomic treatments of families and genera for the state flora. Among those receiving degrees from the Department prior to 1940 who became known for their published work and/or teaching careers were Frederica Detmers, Lumina C. Riddle, Lois Lampe, and Clara G. Weishaupt. At the University of Cincinnati, E. Lucy Braun, who devoted a lifetime of study to the ecology of the deciduous forests of eastern North America and the vascular flora of Ohio, must rank as one of Ohio's foremost women botanists.

POLLINATION ECOLOGY AND EVOLUTION OF PEDICULARIS (SCROPHULARIACEAE) IN NORTH AMERICA. Lazarus Walter Macior, Department of Biology, The University of Akron,
2:00 Akron, Ohio 44325

A study of 22 North American species of Pedicularis indicates that the genus has evolved pollination mechanisms coadaptive with bumblebees (Bombus Latr.). Mechanical, ethological and phenological barriers are responsible for reproductive isolation of populations. Each floral mechanism requires a very specific foraging pattern from its insect pollinator. Plant species are pollinator caste, but not pollinator species, specific. Pollinator caste availability is a function of the phenology of blooming and development of annual colonies of pollinator species. Floral morphology reflects close correspondence with insect form and behavior. Pollen functioning in plant reproduction is deposited in specific pollinator body sites from which it cannot be removed by insect grooming but which are contacted by stigmas oriented by the form of the upper corolla lip, through which the style protrudes.

The North American species of Pedicularis are considered derived from one or a few Palearctic species which migrated through Beringia and subsequently diversified through reproductive and geographic isolation. The pattern of speciation identified in North America reflects a similar putative pattern in Palearctic species yet to be investigated.

ON THE POSSIBLE ORIGINS OF THE HETEROPLOID AGAMIC ANTENNARIA PARLINII COMPLEX OF THE EASTERN UNITED STATES. Randall J. Bayer, Department of Botany, The Ohio State
2:15 University, 1735 Neil Avenue, Columbus, Ohio 43210.

Antennaria Gaertner (Asteraceae; Inuleae) is a genus of dioecious, perennial, herbs distributed throughout the temperate to arctic regions of the northern hemisphere. Agamospermy is common in the genus and has led to the formation of many large, taxonomically complex, heteroploid agamic complexes. Diploid species of Antennaria are completely sexual, while polyploid species may be sexual or agamospermous. Two large polyploid complexes and four sexual diploid species occur in the eastern United States. One of these complexes is polyploid Antennaria Parlinii sensu lato (Bayer and Stebbins, in prep.). It is found most commonly as a hexaploid, however tetraploids, pentaploids, and octoploids do occur sporadically. Both sexual and asexual populations exist and each type has a defined geographic distribution. It is probable that most agamic complexes arise from hybridization between sexual diploid species. Crosses were made among four sexual diploid species of Antennaria occurring in the eastern United States to determine which of the sexual diploids were the probable diploid progenitors of the A. Parlinii complex. Artificial interspecific hybrids were compared with naturally occurring polyploids using discriminant analysis and principle components analysis to demonstrate the close similarity between the artificial hybrids and the natural polyploids. It seems probable that A. Parlinii arose from hybridization between A. plantaginifolia (L.) Richardson and A. solitaria Rydberg followed by polyploidization.

TAXONOMY AND PHYLOGENY OF ACMELLA A. RICH (COMPOSITAE). Robert K. Jansen, Botany Dept., Ohio State University, Columbus, OH 43210.

2:30

Acmella is a pantropical genus which exhibits a high degree of chromosomal and morphological variation. Chromosomally, most populations are known at the diploid, tetraploid, or hexaploid level. Hybrid odd polyploids are also

known at the triploid and pentaploid levels with some of these exhibiting apomixis. The complicated morphological and chromosomal variation has made it difficult to clarify the taxonomy of Acmella. To aid in drawing taxonomic limits within the genus a phenetic study was undertaken employing clustering and principal components analyses. The results of the numerical analyses support the recognition of 24 species some of which have recognizeable varieties. To understand the phylogeny a cladistic analysis using parsimony techniques (Wagner-78) was completed. One of the problems with this technique is that it does not necessarily give the most accurate representation of hybrid taxa. Because of the reticulate patterns of evolution within Acmella hybrid taxa were excluded from the cladistic analysis and added to the cladogram of the non-hybrid taxa. The results of both the phenetic and cladistic analyses are used to construct an infrageneric classification of Acmella, in addition to providing insights toward a better understanding of the patterns of evolution.

FLORA OF BUTLER COUNTY, OHIO. Charles R. Werth, William P. Pusateri, and Gary W. Snyder. Department of Botany, Miami University, Oxford, Ohio 45056.

2:45 Although political boundaries are of necessity artificial, Butler County occupies what is essentially a geologic unit in far southwestern Ohio, defined by Ordovician-aged bedrock, Wisconsin-aged glacial deposits, and drainage by the Great Miami River. This geologic uniformity has resulted in a low diversity of habitats and consequently of species. The county is underexplored botanically, probably because its low diversity as well as its pervasive agriculture and industry have rendered it unattractive to botanists. A thorough floristic survey of Butler County, together with 3 adjacent natural areas, has now been carried out. A preliminary catalogue includes more than 750 vascular plant species of which approximately 25% are exotic. Among these are numerous county records and some new records for Ohio endangered and threatened species. Finalization of the catalogue and phytogeographic analysis are in progress.

CHEMICAL VARIATION IN AESCULUS GLABRA L. AND A. OCTANDRA MARSH. (HIPPOCASTANACEAE).
3:00 Pilatowski, Ronald E., Department of Botany, The Ohio State University, 1735 Neil Ave. Columbus, OH. 43210.

Aesculus glabra L., Ohio buckeye, normally found in the area of Wisconsinan glaciation, and Aesculus octandra Marsh., the Yellow buckeye distributed throughout the Southern Appalachians, are known to hybridize where their ranges overlap in southern Ohio. Morphological intermediates can be identified only in flower and fruit, leading to difficulty in identifying the hybrids and the introgressants in the field. Leaf flavonoids were examined to determine whether or not these compounds could be of use in documenting hybridization and introgression in these taxa. A complement of Quercetin-3-O-Glycosides occur in the taxa. Consistent and characteristic patterns were obtained for each species, but no variation was observed in the morphological intermediates. Seven isozyme systems were examined to determine whether species-specific electromorphs could be detected. The systems used were: GOT, LAP, PGM, PGI, ADH/GDH, and MDH. Distinctive banding patterns were obtained for the two species. Variation was observed within populations for both taxa. More importantly, additive banding patterns were obtained for plants occuring in the area of sympatry of A. glabra and A. octandra. These data are significant in light of the paucity of isozymic information for woody plants.

PARSIMONY ANALYSIS, CHARACTER COMPATIBILITY CLADISTICS, AND PHYLETIC RELATIONSHIPS IN SEVERAL CLOSELY RELATED SPECIES OF CHENOPODIUM OF THE WESTERN UNITED STATES.
3:15 Pilatowski, R. E., Crawford, D. J. and T. F. Stuessy. Department of Botany, The Ohio State University, 1735 Neil Avenue, Columbus, OH. 43210.

The method of parsimony analysis, based upon the idea that evolutionary change is an infrequent event and that evolutionary estimates require the fewest character state changes, was employed in developing a phylogeny for several closely related diploid species of Chenopodium occuring in the western United States. Wagner Trees were developed using 15 morphological and chemical characters for 9 taxa of Chenopodium: C. atrovirens, C. desiccatum, C. fremontii, C. hians, C. incanum var. incanum, C. incanum var. occidentale, C. incanum var. elatum, C. pratericola, and C. leptophyllum. The resulting trees were compared with those generated by a previous application of character compatibility techniques and an intuitively-derived phylogeny. Significant differences were noted in the trees generated between the two cladistic approaches. The character compatibility trees suggest that C. desiccatum is derived from the C. incanum complex, a suggestion not supported by the parsimony analysis. The parsimony techniques agree more closely with the intuitive phylogeny for this group, than do the character compatibility trees.

3:30 TAXONOMIC AND PHYLOGENETIC IMPLICATIONS OF LEAF ANATOMY IN AEONIUM WEBB &BERTH. (CRASSULACEAE). Ho-yih Liu, Department of Botany, The Ohio State University, Columbus, Ohio 43210

Aeonium is a Macaronesian genus of about thirty-nine species, with the greatest diversity in the Canary Islands. In order to supplment morphological study of the floral structure, and to examine the possible phylogenetic relationships within the genus, twenty-eight species native in the Canary Islands were selected for investigating the difference in leaf blade anatomy and epidermal surface patterns. The abundance and distribution of cell types were recorded from leaf blade cross-sections. The leaf epidermal surface was also studied for types, abundance, and distribution of epidermal cells, trichomes, and stomata. These characters were found to correspond to the type of habitats in which the plants grow, and in addition to being of taxonomic significance. A modified classification and possible evolutionary relationships among species was proposed by using a numerical phenetic and cladistic analysis based on these micromorphological characters.

3:45 ULTRASTRUCTURAL INVESTIGATIONS ON THE BIFLAGELLATE MOTILE CELLS OF THREE SPECIES OF CLADOPHORALES (ULVOPHYCEAE, CHLOROPHYTA) AND THEIR SYSTEMATIC IMPLICATIONS. Mark G. Taylor, Charles J. O'Kelly, and Gary L. Floyd. Department of Botany, Ohio State University, Columbus 43210.

The ultrastructural features of the biflagellate isogametes of Cladophora flexuosa, and the biflagellate swarmers of C. dalmatica and Chaetomorpha aerea, are nearly identical to one another and to other members of the Cladophorales. The two basal bodies overlap proximally, and are connected by a characteristically striated distal connecting fiber. No auxiliary basal bodies are present. The rootlet system is cruciate, with alternating 3/1 and 2-membered rootlets. Striated and nonstriated electron-dense materials having characteristic structure and orientation accompany the basal bodies and rootlets. The biflagellate motile cells of these species are ultrastructurally identical to the quadriflagellate motile cells of other members of the Cladophorales, except for the absence in the former of two basal bodies that would correspond to the lowermost basal body pair in the quadriflagellate cells. Motile cell fine structure varies little among the species and genera of the Cladophorales, and is very comparable to that of other green algae placed in the Ulvophyceae. The Cladophorales, therefore, is a closely-knit group of organisms referrable to the class Ulvophyceae of the Chlorophyta.

4:00 CURRENT ISSUES CONCERNING THE TAXONOMY OF CERATOPHYLLUM: Donald H. Les, Department of Botany, The Ohio State University, Columbus, Ohio 43210.

The genus Ceratophyllum has historically received little attention in regard to basic biology, anatomy, ecology and taxonomy. Consequently, the genus is poorly understood in comparison to other angiosperm genera. In preparation of a monographic revision of the genus on a global scale, the author has begun to assess some of the problems associated with various aspects of Ceratophyllum, particularly with regard to the use of taxonomic characters, nomenclatural problems, and difficulties with present concepts of the classification of the family Ceratophyllaceae. Pertinent past research, present studies and future goals are discussed in relation to the preparation of the monograph.

4:15 TAXONOMIC STUDY ON LEUCOBRYUM ALBIDUM (BRID. EX P.-BEAUV.) AND LEUCOBRYUM GLAUCUM (HEDW.) ANGSTR. EX FR. (BRYOPHYTA) Mary M. Finnen. Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio 45221

Three major morphological features have been traditionally used to distinguish Leucobryum albidum from L. glaucum: 1) overall leaf length, 2) ratio of leaf apex-to-base, and 3) the arrangement of chlorocysts to leucocysts as viewed in cross-section of the leaf. Leaf length of Leucobryum albidum ranges from 1.07 to 6.63mm (mean-3.07mm). Leucobryum glaucum leaf length ranges from 1.26 to 9.34mm (mean-4.52mm). These two taxa exhibit continuous variation in leaf length. The apex-to-base ratio of Leucobryum albidum ranges from .43-3.26 (with a mean of 1.41). Leucobryum glaucum apex-to-base ratio ranges from .35-5.25 (with a mean of 1.46). Eighteen variations in the arrangement of chlorocysts to leucocysts were found in cross-section of leaves. Data indicates the morphological features traditionally used to distinguish Leucobryum albidum and L. glaucum intergrade.

GEOGRAPHICAL VARIATION IN THE AMERICAN HORNBEAM, CARPINUS CAROLINIANA WALT. John J. Furlow. Department of Botany, The Ohio State University, Columbus, Ohio 43210.

4:30 The American Hornbeam, Carpinus caroliniana, is a widespread species whose geographical distribution extends from southern Quebec to Iowa and south to Central America. In the past, workers have frequently noted differences in the morphology of plants from various parts of this range, and several infraspecific groups have been identified and treated as varieties. Yet none of these taxa has gained significance acceptance, and an analysis of the regional variation of the group as a whole has not been undertaken. In the present study, populations from throughout the geographical range of this species were examined, both in the field and from herbarium material. Data were accumulated and used with several statistical techniques, including clustering and ordination. From these analyses, it is shown that the region of greatest morphological variability occurs in the southern Appalachian highlands and that obvious clinal variation exists in many of the north-south ranging segments of the species. A number of geographical and ecological races are identified and described. These show varying degrees of morphological distinctness, several enough to warrant formal taxonomic recognition, probably at the rank of subspecies.

4:45 SPECULATIONS ON THE POSSIBLE SIGNIFICANCE OF SEED DIMORPHISM IN SALICORNIA EUROPAEA L. Jeyarany Philipupillai and Irwin A. Ungar, Department of Botany, Ohio University, Athens, Ohio 45701.

Salicornia europaea is a highly salt tolerant halophyte that produces dimorphic seeds. In this study the germination of seeds from three populations of S. europaea from an inland salt marsh at Rittman, Ohio was studied. The seeds were germinated in the laboratory under different salinity levels. Temperature and cold pretreatment were two other factors that were studied.

Several hypotheses concerning the adaptive significance of seed polymorphism to annuals in unpredictable environments have been proposed. Further evidence from seed bank and soil salinity studies in the field is presented to support these hypotheses in the case of S. europaea.

B. PLANT SCIENCES

THIRD AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 214

T. RICHARD FISHER, PRESIDING

1:30 BUSINESS MEETING, DENNEY HALL 212

SYMPOSIUM: THE HERBARIUM RESOURCES OF OHIO: PRESENT STATUS AND FUTURE DIRECTIONS. ARRANGED BY TOD F. STUESSY

1:45 IMPORTANCE AND VALUE OF HERBARIA WITHIN OHIO. CHARLES C. KING

ORIGIN AND DEVELOPMENT OF HERBARIA IN OHIO. Ronald L. Stuckey, Department of Botany, The Ohio State University, 1735 Neil Avenue, Columbus, Ohio 43210.

2:00 It was nearly 90 years after Ohio was admitted to the Union before a State Herbarium was organized in Columbus. The earliest collections of vascular plants in the state were made by Manasseh Cutler (1788), André Michaux (1793), and Thomas Nuttall (1810, 1816). By 1810, permanent residents began recording the flora and preparing herba-

rium specimens. First among these was Dr. Daniel Drake of Cincinnati, who was foremost in promoting the study of botany in the Ohio valley. During the 1830's, the golden years of plant collecting by the pioneer botanists in Ohio, Drake's efforts came to fruition in his student, Dr. John L. Riddell, who, through his field work, teaching, and publications on the flora and techniques for making herbarium specimens, involved a number of individuals in the study of botany early in the decade. Many of these individuals contributed specimens to the Flora of North America project of Drs. John Torrey and Asa Gray of New York City later in the decade. At this time, institutional herbaria were formed within newly organized scientific, medical, and philosophical societies, but these early attempts in community contributed herbaria failed. The private herbaria of the pioneer collectors were: either donated to larger institutions outside the state, left to an institution within the state that remained small or later disappeared, retained by family members, or destroyed by fire or lost. The development of private and institutional herbaria in the state was extremely quiescent from 1850 until the 1890's, when Prof. William A. Kellerman founded the State Herbarium at The Ohio State University. From specimens contributed largely by volunteers, the Herbarium grew under Prof. John H. Schaffner.

2:30 SURVEY OF THE HERBARIUM RESOURCES OF OHIO: VASCULAR PLANTS. Allison W. Cusick, Division of Natural Areas and Preserves, Ohio Department of Natural Resources, Fountain Square, Columbus, Ohio 43224.

An inherent difficulty in scientific research is identifying the resources available to the researcher. The vascular plant resources of herbaria in Ohio were surveyed in order to assess the extent and importance of their collections. Detailed questionnaires were sent to all known Ohio herbaria. Topics covered by the questionnaires include: size and geographic emphases of the collection; access of the herbarium to researchers; collections of especial significance; and ongoing research projects of the herbarium and its staff. A review of the responses to this survey indicates that Ohio herbaria are a scientific resource of considerable importance. Herbaria in the state can play a major role in vascular plant studies today and in the future.

3:00 COFFEE BREAK

3:15 NONVASCULAR PLANT HOLDINGS OF OHIO HERBARIA. Jerry A. Snider, University Herbarium, Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio. 45221.

The algae, fungi and bryophyte holdings of Ohio herbaria were surveyed. The number of specimens, geographical representation, special collections, condition, primary direction and objectives of each herbarium will be discussed.

3:45 OHIO'S HERBARIA AND THE OHIO FLORA PROJECT. Tom S. Cooperrider, Department of Biological Sciences, Kent State University, Kent, Ohio 44242.

The Ohio Flora Project, under the direction of the Ohio Flora Committee of the Ohio Academy of Science, was actuated in 1950. The goal of the Project is the production of an illustrated "Ohio Flora" covering all vascular plants, native and naturalized, with keys for their identification and a county dot distribution map for each species.

Approximately 250,000 specimens of Ohio vascular plants are housed in the State's several herbaria. These specimens provide the main source of data for the Project. They have also provided the main data source for lists of endangered species in the Ohio flora, compiled recently by the Ohio Biological Survey and the Natural Heritage Program of the Ohio Department of Natural Resources.

4:15 THE ROLE OF OHIO'S HERBARIA BEYOND THE STATE. W. Hardy Eshbaugh. Miami University, Oxford, OH 45056.

The primary role of Ohio's herbaria is to support and augment the teaching and research activities within the several institutions of higher education in Ohio. Furthermore, a secondary role provides support for independent projects from various private and governmental agencies within the state. Nonetheless, many of the state's herbaria have a major contribution to make outside Ohio. One such program is in support of individual and institutional loan requests for systematic and ecological research projects. By endorsing monographic, revisionary, and floristic investigations we enhance the value of our own collections by expert specimen identification verified by annotation. Another important function of the herbaria is to provide data for inquiries regarding State Heritage Programs, the Endangered

Species Act, etc. Such requests serve to document the lack of computer based data sets within the state's herbaria. Several other ways in which the herbaria serve the public beyond the state is 1) by the maintenance and housing of special interest collections, 2) through public exhibitions, and 3) as information resources for professionals including doctors and lawyers.

4:45 OHIO'S HERBARIUM RESOURCES: WHERE DO WE STAND AND WHERE ARE WE GOING? Tod F. Stuessy, Botany Department, The Ohio State University, Columbus, Ohio 43210.

There exist within Ohio 28 identifiable herbaria. The largest of these is at Miami University and it has the broadest familial and geographic coverage. The herbarium of Ohio State University is the largest in Ohio material and has many of the important historical state records. The other herbaria of the state have differing objectives and specializations, with some focusing on regional areas within the state, and others on special groups of research interest on a world-wide basis. These resources together provide a meaningful series of collections for scientific research and service activities within Ohio as well as nationally. Despite these impressive resources, little coordination exists among the different collections. Better communication and interaction among these various herbaria should be developed to allow the service and research potential to be realized fully. The Ohio Flora Project now in progress has utilized these herbarium resources and has pointed to areas of the state that need further inventory. To achieve these goals, it is recommended that better communication be established among our state collections by the establishment of an informal association of herbaria.

C. GEOLOGY

FIRST MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 238

F.W. CROPP, PRESIDING

8:30 THE STATUS OF WOMEN IN THE EARTH SCIENCES. Judith B. Moody, ONWI-Battelle, 505 King Ave., Columbus, OH 43201.

In 1980 women received 25% Bachelor's, 20% Master's and 10% Ph.D. degrees awarded in the earth sciences, representing a continuing increase in degrees received begun in the early 1970s. Entry-level employment has ceased to be a problem in the present active market for geologists in the energy-related industries. Traditional employment opportunities for women in academia and government have decreased because of the small number of newly available positions. The percentage of faculty women in earth-science graduate-degree granting departments at the associate and full professor level (<2% at each rank) has not changed since 1964. University faculty women continue to face discrimination in hiring, salary, and promotion when compared to their male colleagues. A 1980 survey of professional women employed by the Geologic Division of U.S. Geological Survey indicates that the female geologist does not have equivalent civil-service ranking or salary when compared to male geologists at the same degree level and years of experience. Also, a disproportionate number of women at the bachelor's degree level are classifed as geologic technicians rather than as geologists. Approximately 55% of all earth scientists work in the oil industry. Employment of women in the oil industry is so recent (since 1976) that data is scarce on their status. What information is available indicates a gap in salary and promotional opportunities <u>after</u> initial hiring of female geologists. With expanding career opportunities in industry and the recognition by employers of the unique capabilities of women earth scientists, fair and equitable treatment in hiring, salary, and promotion should become more of a reality in the 1980s than presently available data indicate.

8:45 ARCHAEOGEOLOGY AT TELL EL HESI, ISRAEL. Frank L. Koucky, Department of Geology, The College of Wooster, Wooster, Ohio, 44691.

Tell el Hesi was an important Late Bronze Age City in the southeastern corner of the Israel Coastal Plain (Plain of the Phillistines), where it bordered on the Negev (southern desert) and the Shephela (foothills). Examples are provided of archaeogeologic investigations during excavation aiding in site interpretation and the paleoenvironment of the site is briefly outlined. A study of thick ash accumulations along the walls that were interpreted as destruction ash are reinterpreted as normal industrial ash. The stone laid platform fronting the city walls, originally interpreted as a glacie (defense ramp), is reinterpreted as an all weather road. Geological examination of the unearthed material culture provides more complete descriptions, new insight into its usage, and often knowledge of trade patterns.

A REVIEW OF THE FAMILY COLOSTEIDAE (AMPHIBIA, TEMNOSPONDYLI). Robert W. Hook, Department of Zoology, University of Toronto, Erindale College, Mississauga, L5L 1C6, Ontario, Canada.

9:00

The amphibian family Colosteidae, a lineage of specialized aquatic predators, represents the earliest known non-ichthyostegid labyrinthodont radiation. The family is characterized by the presence of a tusk on the premaxilla, elongate prefrontal contributing to the border of the external naris, anterior labial notch on the dentary, elongate fenestra on the medial jaw surface, posterior marginal pits on the rhomboidal ventral scutellae, and the absence of an intertemporal bone and otic notch. The oldest colosteid, Pholidogaster (=Otocratia) pisciformis, is known from the Burdiehouse Limestone (Middle Viséan) and the Gilmerton Ironstone (Upper Viséan) of the Lower Carboniferous of Scotland. Greererpeton burkemorani, a slightly younger but similar form, occurs in the Bickett (Upper Viséan) and Hinton (Namurian A) Shales of West Virginia; an additional Mississippian-age specimen has been collected from the Point Edward Formation (Namurian A) of Nova Scotia. Poorly preserved colosteid material is also present in the famous Upper Carboniferous tetrapod fauna of Jarrow, Ireland (Westphalian A). The last record of the family is Colosteus scutellatus, known exclusively from the classic Pennsylvanian locality of Linton, Ohio (Westphalian D). The absence of colosteid remains in subsequent deposits is attributed in part to the coincident rise of more lightly built trimerorhachoid amphibians.

HABITATS OF NEARSHORE FORAMINIFERA, ST. CROIX, U.S. VIRGIN ISLANDS
Don C. Steinker and Annette L. Rayner, Department of Geology, Bowling Green State University, Bowling Green, Ohio 43403

9:15

No publications are known that deal with the nearshore benthonic foraminifera of St. Croix. St. Croix lies near the northern end of the Lesser Antilles and has a tropical climate. Nearshore sediments consist of a mixture of terrigenous clastics and biogenic calcareous particles, including the tests of foraminifera. Living and dead assemblages of foraminifera were collected from bottom sediments and from phytal substrates in the shallow waters of Tague Bay and in the nearshore zone off Romney Point at the eastern end of Tague Bay near the northeast corner of the island. Few foraminifera were found to be alive among the bottom sediments. The encrusting foraminiferan Homotrema rubrum was found living attached to pebbles and dead corals in turbulent nearshore waters at Romney Point. Living foraminifera were found to be common on marine plants, including grasses and calcareous codiacean algae. Living foraminifera also were found among sediment-binding clumps of filamentous chlorophyte and rhodophyte algae. Because of size-sorting and the selective destruction of the tests of some species by wave action, the dead assemblages of foraminiferan tests among the bottom sediments do not accurately reflect the living community found mainly on the plants. As a result, although the thanatocoenosis among the sediments may be indicative of the environment of deposition, it is not necessarily a true representation of the living fauna.

ON THE PRESERVATION OF FOSSIL SHARK REMAINS. Michael E. Williams, The Cleveland Museum of Natural History, Wade Oval, University Circle, Cleveland, Ohio, 44108.

9:30

The earliest known elasmobranches are represented in the fossil record by isolated dermal denticles from the Upper Silurian of Russia and by a series of isolated dermal denticles and teeth from the Middle Devonian bonebeds of Ohio, Indiana and Kentucky. From that time to the present, the group is abundantly represented in marine rocks of almost every age by isolated scales, teeth, and spines. Skeletal remains, on the other hand, are exceedingly rare since cartilage (even calcified cartilage) is not normally preserved in the fossil record.
An analysis of several faunas in which shark skeletons are preserved suggests that anaerobic conditions (and the attendant slower decomposition rates of anaerobic bacteria) are essential to the process. The preservation of soft tissues such as muscle fibers and occasional kidney tubules, is apparently related to pecularities of shark physiology, especially the retention of urea.

DESMOINESIAN POLYPLACOPHORA FROM TEXAS
Michael D. DeBrock, R. D. Hoare, Department of Geology, Bowling Green State University, Bowling Green, Ohio 43403, and R. H. Mapes, Department of Geology, Ohio University, Athens, Ohio 45701

9:45

A well preserved polyplacophoran fauna from the Lazy Bend Formation (Desmoinesian), collected near Lipan, Texas, is partially similar in composition to the fauna of the Vanport Shale in Ohio. Helminthochiton simplex (Raymond), Pterochiton spatulatus Hoare, Sturgeon and Hoare and Acutichiton pyrmidalus Hoare, Sturgeon and Hoare are diagnostic components of both faunas. Pterochiton n. sp. A and ?Pterochiton n. sp. B from the Lazy Bend Formation are distinctive forms not known from the Vanport. The apparent absence of the genus Arcochiton and the common species Pterochiton carbonarius (Stevens) in the Lazy Bend Formation may be due to replacement by the new species of Pterochiton.

10:00 MACROFAUNAL COMPARISONS OF THE MIDDLE DEVONIAN SILICA SHALE FORMATION TO ITS EQUIVALENT IN THE TRAVERSE FORMATION IN NORTHEASTERN INDIANA. Wiedman, Larry A. Dept. of Geological Sciences, Wright State University, Dayton, OH 45432

For many years the Middle Devonian Silica Shale has attracted much attention from the paleontologic community because of its fossiliferous nature and superb preservational qualities. In 1975 a study by Kesling and Chilman culminated in a publication on the megafossils of this unit present near Silica, Ohio. Research on an equivalent unit in northeastern Indiana near Woodburn has indicated that there are definite differences in the soft bottom macrofauna present at each locality.

Not only are some of the relative abundances different, but also some fauna not reported from Ohio have been noted in moderate abundances. Concardium, a mollusc, and Ancyocrinus, a crinoid, are among the new taxa found.

The community that has been reconstructed using data obtained through bulk sampling the unit in Indiana is dominated by the bryozoan, Sulcoretopora, and the following brachiopods: Strophodonta, Mucrospirifer, Paraspirifer, and Devonochonetes. The trilobite, Phacops, many genera of rugose corals and the tabulate coral Aulopora, along with Gilbertsocrinus, a crinoid, Hyperblastus, a blastoid, and many less abundant molluscs, corals, bryozoans, and brachiopods add to the total community diversity. Both localities have the physical properties of a high clastic influx environment as the major factor in limiting the growth of the communities present.

10:15 PETROGRAPHIC ANALYSIS OF DIPLOCRATERION ICHNOFOSSILS FROM THE CINCINNATIAN GROUP (ORDOVICIAN). Winston Norrish, Department of Geology, The College of Wooster, Wooster, Ohio 44691

The trace fossil Diplocraterion, a spreiten-bearing U-tube indicative of high-energy, shallow marine environments, is found in Upper Ordovician calcisiltite beds of the Cincinnatian Group. These beds are thin (4-30 cm) and appear to be storm-related because: (1) fossil fragments are commonly found between calcisiltite beds and underlying shales; and (2) the contact between these beds is usually hummocky in nature. Subsequent deposition was slow, thereby allowing establishment of the dominichnia. Chemical weathering of the mucus used by the organism to support the tube in the unstable substrate results in thin sheets of pyrite and small specks of hematite along the walls of the burrow. The concentration of organic matter in the spreiten indicates the organism did not feed by mining the sediments; instead it probably collected suspended food by pumping water into one opening of the U and out the other. Spreiten were formed as the organism moved down into the soft sediment, plastering the excavated sediment to the upper surface of the existing U-base. Continued downward movement of the tube was controlled by organism body growth and erosion of the sediment surface. Larger burrows exhibit a flaring of the U at its base where the organism found it necessary to expand the tube laterally to avoid the underlying argillaceous sediments.

10:30 FOSSIL HORSES FROM BIG BONE LICK, KENTUCKY John A. Howe, Department of Geology, Bowling Green State University, Bowling Green, Ohio 43403

Big Bone Lick was first visited by white men in 1739 but little precise information was known concerning the deposit until 1960 when the University of Nebraska State Museum began excavations in the area. The equid material collected by the Museum was loaned to me for study and identification. The materials recovered from the excavation indicates the presence of a large equid that exhibits a complex enamel pattern on the triturating surface of the cheek teeth. Because of the characteristics of these elements plus the condition of the ectoflexid in the lower molars and the shortness of a first phalanx in the collection, the specimen should apparently be referred to Equus (Asinus) complicatus Leidy 1858.

10:45 MINERALOGICAL, CHEMICAL AND ISOTOPIC COMPOSITION OF STRONTIUM IN AN EQUINE ENTEROLITH FROM MEDINA COUNTY, OHIO. Karen S. Taylor and Gunter Faure, Department of Geology and Mineralogy, The Ohio State University Columbus, OH 43210

An intestinal concretion (enterolith) was recovered during necropsy of a horse from Medina County, Ohio. It is approximately spherical in shape and measures 9x8x7 cm in diameter. It is composed of the mineral struvite ($NH_4MgPO_4.6H_2O$) which was deposited in concentric layers around a fragment of iron. Cencentrations of Ca, Na, Fe and Sr decrease systematically from the iron center outward, whereas concentrations of K and Rb increase outward. The presence of alkalis is attributable to replacement of ammonium ions. The apparent concentric chemical zonation, which has not been previously reported, may indicate changes in the body fluid. Rb/Sr ratios of the struvite range from 4.9 to 20.7 and are high compared to calcium phosphates. The $^{87}Sr/^{86}Sr$ ratio of the concretion is 0.71006 ± 0.00026 and lies between the $^{87}Sr/^{86}Sr$ ratio of Devonian limestone (0.7083) and that of feldspar

from the Canadian Precambrian Shielf (0.7141). If the Sr concentrations of the two minerals are assumed to be equal, then approximately 70% of the Sr available to plants in the soil in Medina County is derived from calcite from Devonian limestone and 30% is from feldspar that originated from the Precambrian Shield of Canada.

C. GEOLOGY

SECOND MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 245

JANE FORSYTH, PRESIDING

8:45 **THE LATE PRECAMBRIAN "GLOBAL" GLACIATIONS: A REVIEW OF HYPOTHESES OF ORIGIN**
Robert J. Malcuit, Dept. of Geol. & Geog., Denison Univ., Granville, OH 43023

Late Precambrian mixtite deposits appear to be very important stratigraphic marker horizons in the geologic record because of their widespread distribution and distinctive litholigies. The major features to be explained by a genetic model are: (1) the global distribution, (2) the presence of two distinct tillite horizons in the more complete sequences (typical example, the Adelaide Geosyncline, South Australia), (3) the association of stromatolitic carbonates and tillites including interlayering of the two in some sequences, e. g., the Port Askaig, Scotland, deposits, and (4) the low paleomagnetic paleolatitude determinations for many of the deposits. Item (3) imples an alternation of tropical and frigid conditions repeatedly affecting the same region of Earth. Hypotheses for explanation of these unusual deposits fall into two broad categories: (1) geological hypotheses and (2) astronomical hypotheses. Proposed geological hypotheses either (a) call upon the large continents of that time to sequentially drift over the polar regions or (b) call upon carbon dioxide fluctuations in the atmosphere to cause an alternate greenhouse and anti-greenhouse effect. Proposed astronomical models mainly involve galactic mechanics and invoke either (a) galactic dust clouds to inhibit solar insolation or (b) a periodic and gradual change in orientation of the Solar System relative to the galaxy and of the Earth relative to the Sun. Whatever mechanism was responsible for producing these unusual glacial deposits on Earth, the climatic conditions of that time may have had a significant effect on organic evolution because the "shelly" fossils enter the geologic record in rock units just above the Late Precambrian glacial sequences.

9:00 MONITORING EROSION ON A CLEARCUT WATERSHED NEAR LANCASTER, OHIO. Russell O. Utgard and Garry D. McKenzie, Department of Geology and Mineralogy, Ohio State University, Columbus, Ohio 43210.

In 1974 3 hectares of eastern hardwood forest were burned at Barnebey Center. Following this fire timber was salvaged by clearcutting in a manner that would minimize erosion with skidding trails across slopes and slash along the contour. Within two months after clearcutting a study was begun to monitor landscape changes. Erosion pins and six transects were established between tree stumps in areas where the subsoil had been exposed during logging. Although the erosion pins were soon abandoned, the profiles obtained at the transectseffectively recorded erosion and sedimentation. In addition to the transects,eight photographic stations were set up to record revegetation and erosion. Intermittent water and sediment sampling at two weirs below the clearcut showed no unusual sediment load compared to adjacent watersheds. The available soils map indicates Muskingum silt and sandy loams over most of the site. In addition to the changes observed at transects, sediment transport was indicated by sandy deposits behind branches across slopes. No sediment wedges developed in the area below the clearcut and above the headwater spring, althoughtransport of sand beneath leaf litter near the spring was observed. No major gullies have developed, but firebreaks are still visible on the site. The overall impact offsite appears to have been minimal and within 5 years of clearcutting vegetation was well established.

9:15 EROSION ON ABANDONED STRIP-MINED LAND, OFFSITE SEDIMENT ACCUMULATION, AND POST-RECLAMATION STREAM RESPONSE, MEIGS COUNTY, OHIO. John L. Lamb Dept. of Geology and Mineralogy, Ohio State University, Columbus, Ohio 43210

Sediment eroded from 75 hectares of 23 year-old abandoned strip-mined land in southeast Ohio accumulated offsite in streams and valley flats, burying 18 hectares of formerly useable farmland and limiting usefulness of other fields adjacent to the streams. Studies begun in 1978 were designed to measure sediment erosion and deposition rates and stream response to changes in the sediment load. Erosion by rill and sheetwash on spoilbanks was measured with several randomly-placed simple traps. Erosion rates ranged from 7000 to 30,000 $t \cdot km^{-2} \cdot a^{-1}$. In the Little Leading Creek valley, clay to pebble-sized deposits were measured by probing, coring, and digging to the premining alluvium, and by recording the depth of fence-post burials. The accumulation rate was 2.4 $cm \cdot a^{-1}$ overall, with deposits up to

200 cm thick in former channels. The original meandering-channel pattern changed to braided as the channel filled with sediment. Cross-channel profiles were drawn from baseline data collected at 21 sites across several streams, including those draining unmined, abandoned, partially reclaimed, and recently reclaimed land. Later measurements will be taken and profiles redrawn to determine the streams' responses to unchanged or reduced sediment loads. Erosion detection markers were placed on several recently reclaimed spoilbanks for later measurement to document topographic changes following reclamation.

HYDROLOGY AND GEOMORPHOLOGY OF CHIPPEWA CREEK BASIN, CUYAHOGA COUNTY, OHIO. Michael B.Preston and John P. Szabo, Department of Geology,
9:30 University of Akron, Akron,OH 44325

Chippewa Creek Basin, located in southern Cuyahoga County, Ohio, occupies a basin of approximently 18 square miles and flows eastward into the Cuyahoga River 4.6 miles upstream from Tinkers Creek. Most of its major tributaries flow on bedrock, although 80% of the basin is covered with glacial till. A morphometric analysis was done on the basin, using the Strahler modified Horton method, to quantify the stream parameters. The lengths of 2576 stream segments and the area feeding that segment were measured. Preliminary results show a bifurcation ratio of 4.58, a stream-length ratio of 0.46 and a drainage density of 17.01 miles/square miles. A surficial materials map was made by field mapping and using an O.C.A.P. analysis of soils to determine soil parent materials, other soil-related parameters and land use. Hydrology was studied using constant stage recording for a six month period. A stage-discharge relationship was developed, and flood predictions were attempted. Using precipitation data provided by the N.E.Ohio Regional Sewer District and discharge data, a hydrologic budget was determined.

THE SHARON FLUVIAL SYSTEMS (EARLY PENNSYLVANIAN) OF OHIO. Michael C. Hansen, ODNR, Division of Geological Survey, Columbus, Ohio 43224.

9:45 The Sharon sandstone (L. Pennsylvanian) of Ohio was deposited in three separate fluvial systems: (1) northern Ohio by south-flowing streams; (2) southern Ohio by a west- then south-flowing stream; (3) eastern Ohio (known in the subsurface from Washington County to Tuscarawas County) by a north-flowing stream. The headwaters of the southern and eastern Sharon were in northern West Virginia on the upthrown northern bounding block of the Rome trough. It is postulated that the Pocono-Black Hand Sandstone (L. Mississippian) was the source for the multicycle quartz arenites of the southern and eastern Sharon. Stratigraphic relationships and paleontologic data indicate that the southern Sharon is older than the northern Sharon.

Analysis of paleoslopes suggests that the northern and eastern Sharon systems were tributary streams of a major river, established in the late Mississippian, that flowed westward from Pennsylvania across north-central Ohio and then southward into Kentucky, following the northern and western edge of the Maxville escarpment. The major lowland created by this postulated master stream appears to coincide with an east-west-oriented marine embayment that persisted throughout the Pennsylvanian. The lowland in which the southern Sharon was deposited appears to represent a separate locus of marine transgression during the early Pennsylvanian.

MINE SUBSIDENCE IN OHIO & PENNSYLVANIA. Ann G. Harris, Associate Professor, Department of Geology, Youngstown State University, 410 Wick Avenue, Youngstown, Ohio 44555.

10:00

Since the summer of 1977 abandoned deep coal and clay mines, many of them over 100 years old have started to subside either over the rooms or over the shafts and slope openings. The subsidence has been occurring in Trumbull, Mahoning and Columbiana Counties, Ohio and Lawrence, Mercer and Beaver Counties, Pennsylvania. Subsidence over rooms can be seen in Mineral Ridge, Trumbull County, Ohio, East Liverpool, Ohio in Columbiana County, Grove City and West Middlesex, Pennsylvania in Mercer County and Neshannock Township in Lawrence County, Pennsylvania.

Some of these areas have never been developed because of the common knowledge that the mines were close to the surface. The remaining areas are developed or are in the process of being developed in spite of the presence of the mine. Problems with subsidence have been aggravated as a result of the extra overburden.

Steps are being taken to prevent development over potentially dangerous areas through local legislation.

THE EFFECT OF WOODY VEGETATION ON SLOPE STABILITY IN THE CINCINNATI AREA, OHIO. Mary M. Riestenberg, Department of Geology, University of Cincinnati, Cincin-
10:15 nati, Ohio, 45221.

Tree roots markedly stabilize colluvium on steep hillsides in the Cincinnati area, Ohio. A landslide complex on the south side of Rapid Run Creek, a tributary of the Ohio River, was analyzed in detail. The shear surface of this slide developed along the interface between bouldery silty clay colluvium and underlying calcareous Ordovician shale, and broke woody roots that penetrated through the colluvium and into the underlying bedrock. Measurements of positions, sizes, and tensile strengths of the roots indicate that the average shear strength contributed by the roots was about 5.7kN/$_m$2 of the shear surface. The average strength contributed by residual friction of the soil was about 0.7kN/$_m$2. The tree roots increased the factor of safety against sliding 9-fold. Root strength allows forested, colluvium manteled hillslopes in the Cincinnati area to resist sliding at slope angles as high as 35°, whereas similar slopes devoid of trees are subject to sliding at slope angles of 12-14°. The contribution of tree roots to slope stability should be evaluated before removal of trees for development of hillsides.

10:30 THE ORIGIN OF SECONDARY CALCITE ASSOCIATED WITH COAL DEPOSITS IN OHIO AND IN THE TRANSANTARCTIC MOUNTAINS. Gunter Faure and Karen S. Taylor, Department of Geology and Mineralogy, Ohio State University, Columbus, Ohio 43210

Calcite is commonly found in joints and fractures of coal seams in the Beacon Supergroup of the Transantarctic Mountains and in the deposits of southeastern Ohio. In addition, calcite may be found in the rocks directly above coal seams. The carbon in calcite samples taken from coal seams in Antarctica and Ohio is enriched in ^{12}C by more than 1.5% relative to the PDB standard. The strontium in these calcites is also enriched in radiogenic ^{87}Sr compared to marine strontium of Carboniferous to Permian age. These results suggest that calcites associated with coal deposits were formed from CO_2 that was produced by oxidation of hydrocarbon gas emanating from the coal. The carbon in coal, petroleum and natural gas is enriched in ^{12}C by more than 2.5% as a result of photosynthesis by plants. The isotopic composition of carbon in secondary calcite found in sedimentary rocks may therefore be a useful indicator for the presence of hydrocarbons.

10:45 See abstract by Rice and Koucky on p. 109

C. GEOLOGY

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 238

DOUGLAS PRIDE, PRESIDING

1:30 BUSINESS MEETING

1:45 FORMATION AND PRESERVATION OF OXYGEN-18/OXYGEN-16 CYCLES ON THE SOUTHERN DOME OF THE GREENLAND ICE SHEET William A. Bow and Ian M. Whillans 125 S. Oval Mall Columbus, Ohio 43210

The analysis of O^{18}/O^{16} cycles has played an important role in the interpretation of deep ice core records such as those at Camp Century and Dye-3, Greenland. It is understood that there is seasonal change in the delta values, primarily due to a change in the temperature of formation of the snow and the distance to the source area of the precipitation. However, the importance of diagenesis (primarily vapor diffusion) has not yet been thoroughly studied. Several diffusion models are presented and applied to eight-20 meter cores taken across the Southern Dome of Greenland.

It is proposed that the formation of seasonal (?) ice layers plays a major role in the preservation of O^{18}/O^{16} cycles, especially in the percolation facies, where the layers formed are thin in proportion to the annual accumulation. These ice layers can be thought of as plastic sheets, in that no substantial diffusion, or mass transfer, can occur across them, thus isolating one year's snow from another. It follows from this that if enough mass exchange can occur, and if there is fractionation from the solid to the vapor phase, that the cycles can not only be preserved, but also formed during diagenesis, and thus placing less emphasis on the depositional theory of seasonal variation. Also, the number of ice layers in one year has an effect on the number of cycles produced in that year, on a one to one basis.

2:00 QUATERNARY STRATIGRAPHY OF THE CENTRAL PART OF THE CUYAHOGA VALLEY NATIONAL RECREATION AREA, NORTHERN OHIO. Laddy Ospanik, Kevin Donovan and John P. Szabo, Department of Geology, University of Akron, Akron, OH 44325

Wisconsinan tills crop out along the sides of the Cuyahoga Valley between Peninsula and Brecksville in the central part of the Cuyahoga Valley National Recreation Area. Firm, gray, unweathered, Early Wisconsinan Mogadore Till is found in few tributary valleys. This till is overlain by thick, interbedded silts and sands. An unnamed till overlies the silts and sands in the southern part of the area and bedrock in the northern part. The unnamed till forms the core of the Defiance Moraine at Peninsula, Ohio and splits into two subunits north of there. Dark gray and unweathered till has a high clay content and a calcite-dolomite ratio equal to 0.6. The coarse sand lithologies contain predominantly shale and siltstone and more limestone than dolomite. The clay fraction consists of illite, chlorite and kaolinite which suggest a source area similar to that of the Mogadore Till or the Late Wisconsinan Kent Till. Late Wisconsinan Lavery Till crops out on the uplands and summits of long, narrow interfluves. This till is sandier and more calcitic than the unnamed till. The clay mineralogy contains very little kaolinite which differs from the older tills.

2:15 EROSION AND SEDIMENT TRANSPORT IN OLD WOMAN CREEK ESTUARY, ERIE COUNTY, OHIO David B. Buchanan, Division of Reclamation, Department of Natural Resources, Fountain Square, Columbus, Ohio 43224

Periodic fluctuations in the level of Lake Erie have created an intermittently marshy embayment at the flooded mouth of Old Woman Creek. This embayment acts as a fresh-water estuary in transition between terrestrial and lacustrine depositional environments. Deposition within the estuary is largely controlled by adjacent lake levels.

Textural analyses, x-ray photography, and C-14 dating of sediment cores yield long-term depositional rates in the estuary of 1 mm/year. More recent depositional rates as indicated by recovered sediments and study of the estuary configuration have been accelerated to around 4 mm/year as a result of agricultural erosion within the 17,000-acre Old Woman Creek drainage basin. Suspended-sediment calculations indicate that the majority of this deposition occurs during high-flow storm events.

Textural studies of core material also show an upward-fining sequence of deposition within the estuary correlative with the rise in the postglacial level of Lake Erie and the corresponding depositional base level in the estuary. Reduction in the stream gradient within the estuary and nondepositional events are also indicated in the sediment record.

2:30 TRACER SAND MOVEMENT ALONG A SAND POOR SHORE, WESTERN LAKE ERIE; PRELIMINARY RESULTS FOR A BEACH CONSTRUCTION PROJECT. Jonathan A. Fuller, Ohio DNR, Division of Geological Survey, Box 650, Sandusky, Ohio 44870 and Joan Pope, Army COE, Buffalo District, 1776 Niagara Street, Buffalo, New York 14207.

This sand transport study is part of a larger project to test the feasibility of constructing a recreational sand beach along the shore of Maumee Bay State Park near Toledo, Ohio. The natural shore along Maumee Bay is made up of low clay banks which are being eroded at 2-3 meters per year. The clay contains about 3 percent sand, erosion of the clay provides little sand so natural sand beaches are rare. Little information is available about the littoral transport of sand within this sand deficient area, therefore a field experiment was designed to provide baseline data on sand transport, and to test the simplest beach construction alternative, that of beach fill without protective structures. In October 1981 a 300 meter long, 120 meter wide section of the beach-nearshore environment was surveyed in detail prior to placement of 38 cubic meters of tracer sand. The sand was placed in a 3 meter wide band extending out 30 meters normal to shore at a position halfway along the 300 meter baseline. Preliminary results from three surveys in October and November indicate that the placed sand was transported quickly westward and onshore by waves and wave-induced currents. No indication of offshore movement of the placed sand has been noted to date although lakeward movement of a pre-survey offshore bar (lakeward of the placed sand) was noted. Repetitive surveys were scheduled to be made at monthly intervals and after storms through March of 1982.

2:45 MINERALOGY OF WESTERN LAKE ERIE SAND-SIZED SEDIMENTS. Robert Anderhalt, Michael J. Roberts, Paul T. LeClair, Department of Geology, Bowling Green State University, Bowling Green, Ohio 43403.

The percentages of quartz, potassium feldspar, and plagioclase in the sand fractions of western Lake Erie surface sediments were determined by semi-quantitative x-ray diffraction analyses. A majority of the sampling area which consisted of 300 stations, is contained within a triangle with one apex at West Sister Island and the other two apices along

the Michigan shore about 8 km northeast and 12 km southwest of the River Raisin. Approximately half of the stations are on the Michigan side of the state boundary.

Sands collected immediately offshore of the major tributaries adjacent to the study area show a general trend in which the northern streams are relatively enriched in plagioclase, while the more southern streams have a more nearly equal distribution of plagioclase and potassium feldspar. The distribution of sand mineralogy in the lake sediments can be interpreted in terms of dispersal patterns from these tributaries, although this does not rule out other possibilities for the origin of the sand. The quartz content of most of the sand fractions range from 50 to 80% with most samples collected near the tributaries having slightly less quartz than the more offshore sand fractions. This trend of quartz contents is as would be expected due to the increasing maturity of the sands reworked by the lacustrine hydraulic regime.

ORIGIN OF THE OAK OPENINGS SAND. Michael H. Grube and Jane L. Forsyth Department of Geology, Bowling Green State University, Bowling Green, Ohio 43403

3:00 The Oak Openings, a five-mile-wide belt of fine sand up to 40 feet thick, extending from southwestern Lucas County northeast to near Detroit, Michigan, has long been famous among geologists, biologists, and geographers. For biologists, it is the unique species of plants and animals, occurring in response to alternating bands of wet and dry sites created by the intersection of the water table and an irregular dune/blowout topography, that make it famous. For geographers, it is the special effects of the variably wet and invarably infertile landscape on man's life and history there. But for geologists, it is the classic question as to the origin of the sand.

Local detailed study of the nature of the sand within Ohio reveals that it is uniformly fine and dominantly eolian (well sorted and positively skewed, the critical eolian characteristics of Friedman, 1961). Only farther north, in Michigan, along the Huron River near Ypsilanti and the River Rouge near Plymouth (and also, though not investigated, still farther north), as revealed by reconnaissance surveys, are coarser materials present, representing deltas built into the early ice-dammed lakes in the Erie basin. Our interpretation, based on elevations and distribution of the different kinds of sand, is that this sand was deposited in Glacial Lakes Warren (I, II, and III) and Wayne as rehandled deltaic sand from sand-rich sources in Michigan, sand that was subsequently moved southward by longshore currents after intensive winnowing by wind during repeated lowerings of lake level during Warren/Wayne time.

3:15 BREAK

HIGH-TEMPERATURE STRENGTH OF POLYPHASE ROCK: CONSTRAINTS ON THE POWDER METAL ANALOGY. Thomas M. Tharp, Department of Geosciences, Purdue

3:30 University, West Lafayette, Indiana 47907

The mechanical behavior of some polyphase rock types is analogous to the mechanical behavior of porous powder metal. In some rock types one or more minerals constitute a load-carrying framework, while subordinate incompetent phases carry little load. The yield strength of porous powder metal is analogous to the high-temperature power law flow stress for such rock. The Young's modulus of porous powder metal is related to the flow stress for Nabarro-Herring creep. For both analogies flow stress is a simple function of the volume fraction of the incompetent phase.

The analogy between porosity in powder metal and the incompetent fraction in rock requires a large viscosity contrast between the competent and incompetent phases. The required contrast is evaluated by elastic inclusion theory. The self-consistent sphere approximation suggests that a viscosity ratio of 100 is sufficient. If the incompetent fraction is less than 0.3, a ratio as small as 10 is adequate. For an incompetent fraction of 0.4 the power law flow stress is reduced by 90% and the Nabarro-Herring flow stress is reduced by 80%.

AN OCCURRENCE OF THE MINERAL DIADOCHITE IN COSHOCTON COUNTY, OHIO. Dennis N. Hull and Michael C. Hansen, ODNR, Ohio Division of Geological Survey, Columbus, Ohio

3:45 43224.

Abundant nodular masses of the mineral diadochite [$Fe_2(PO_4)(SO_4)(OH)\cdot 5H_2O$] were recently discovered by L. R. Ruegsegger (ODNR, Division of Reclamation) in reclaimed spoil at a strip mine in Coshocton County, Ohio (NW¼ SE¼, section 5, Jackson Township). This occurrence of diadochite is the first to be reported from Ohio and indeed the first occurrence to be reported from the eastern United States. Two occurrences have been reported previously from California and Nevada.

The diadochite occurs as flattened, colloform, well-crystallized, pale-greenish-yellow (10Y 8/2), nodules ranging in size from 1.5 cm to 10.5 cm. The diadochite is thought to be

derived from the marine Columbiana Shale (Pennsylvanian System, Allegheny Group) that overlies the stripped coal (Lower Kittanning No. 5) at this locality. No highwall exposures existed in the mine area at the time of discovery of the diadochite and the speculative derivation of the nodules is based upon their abundant occurrence within the Columbiana Shale spoil and the presence of lithologically identical shale adhering to crevices on the nodule surfaces. No diadochite nodules were found within small pieces of Columbiana Shale exposed in the surface spoil; however, some of this shale is rich in other secondary minerals including sheets of selenite on bedding planes and fracture fillings of pulverulent jarosite [$KFe_3(SO_4)_2(OH)_6$]. Diadochite has been reported with similar mineral associates in Namurian rocks of Belgium.

PETROGENESIS OF THE DILLON GRANITE GNEISS. David A. Beckett, Department of Geology, College of Wooster, Wooster, OH 44691

4:00 The Ruby Range is an uplifted, fault-bounded block in southwestern Montana. Stratigraphically, the block is formed by three Precambrian units: Cherry Creek Group, comprised of gneisses and marbles; Dillon Granite Gneiss; and Pre-Cherry Creek, comprised mainly of hornblende gneiss (Pony Group?). Some workers, such as Heinrich (1950), believed the Dillon Granite Gneiss to be the youngest of the three units based upon K-Ar dates of 1,600 m.y. (Giletti, 1966). The Dillon was therefore believed to be an igneous intrusion. The Dillon is here interpreted to be as old as the other two units and metasedimentary in origin. This conclusion is based upon the following three lines of evidence: 1) field relationships between the Cherry Creek Group and Dillon Granite Gneiss; 2) Rb-Sr whole rock dates of 2,700 m.y. for the Dillon; and, 3) the general geology of other Precambrian blocks in Montana and Wyoming, which also have a similar trend and Precambrian (Archean) core.

STRATIGRAPHY OF THE COLTON FORMATION, CENTRAL UTAH. Deana Chapman, Richard Alley, and John Zawiskie, Dept. of Geol. and Min., Ohio State University,
4:15 125 S. Oval Mall, Columbus, Ohio, 43210.

The Paleocene-Eocene Colton Formation of central Utah is exposed along the Sanpete Valley and on the north side of the San Rafael Swell. It is a fluvial tongue separating the lacustrine deposits of the Flagstaff and Green River Formations. Paleocurrent measurements from the north side of the San Rafael Swell show both a component around the swell and a radial component from the swell. From Soldier Summit to the Price River Canyon, the Colton consists of meandering stream and deltaic deposits. Farther east, and slightly up depositional dip, low-energy fluvial deposits at the base and top of the formation are separated by higher-energy fluvial deposits, possibly from a braided stream system. These high-energy deposits may reflect uplift of the swell, and/or climatic change. In the Sanpete Valley, clastic fluvial sediments dispersed to the northwest alternate with abundant carbonates, which probably represent both playa-lake deposition on flood plains and expansions of Lake Uinta from the north and west. Abundant mica in Colton sands indicates a volcanic or crystalline source, possibly the Henry Mountains. Recycled Cretaceous sand is probably important in the high-energy deposits on the north side of the swell.

GROUND-WATER WITHDRAWAL, LAND SUBSIDENCE AND EARTH FISSURING IN LAS VEGAS VALLEY, NEVADA. Michael J. Smith, The College of Wooster, Wooster, Ohio 44691
4:30

Ground-water withdrawal by wells began in Las Vegas Valley in 1906. Increasing population has led to ground-water mining in which withdrawal since 1940 has far exceeded recharge rate to aquifers, resulting in ground-water depletion and head loss with eventual reduction of aquifer storage capacity through compaction. Leveling data indicate a deepening and widening subsidence bowl has been developing in Las Vegas Valley as a result of ground-water withdrawal and compaction of sediments. Because the city of North Las Vegas has expressed an intent to continue ground-water mining within the limits imposed by legal and physical restraints, continued subsidence is inevitable. Subsidence on more localized levels has occurred in the vicinity of well fields. Earth fissuring has been observed in Las Vegas Valley for at least 25 years. Fissures in the area are interrelated with the following features: seismic activity in Nevada and California, regional tilting in response to the added weight of nearby Lake Mead, piping fissures which result from erosion of materials from pre-existing fractures, desiccation cracks, and localized ground motion caused by underground nuclear events at the Nevada Test Site north of Las Vegas. Earth fissures have caused major damage to roads and structures and present threats to future development in Las Vegas Valley.

4:45 PHENOMENA ASSOCIATED WITH THE ACTIVE DRAINAGE OF A PERCHED WATER TABLE IN PRESQUE ISLE COUNTY, MICHIGAN. D. C. Stewart, W. A. Butcher, and R. A. Schooler, Department of Geology, Bowling Green State University, Bowling Green, OH 43403.

A breach in the perched water table at Rainy Lake, a 260-acre lake located in the northeastern portion of Michigan's lower peninsula, has caused a water loss from the lake at a rate of 850,000 gal/day. This semiconstant water loss has resulted in a decrease of 25 ft in the surface level of the lake over an 18-month period. The original lake has been reduced to two ponds, a more substantial one of about 60 acres lying to the west of a smaller one of about 5 acres. The location of the ponds is controlled by sinkholes developed in the glaciated and karsted limestone bedrock of the Traverse group (Devonian). Measurements of bottom currents in the larger pond indicate that water is actively draining through a subterranean system that connects to the ground-water interface through four sinkholes located near the midpoint of the original lake. This location coincides with the intersection of the two predominate lineaments of the region (E-W and N35W). A further substantiation that the location of the breach is in the subterranean system beneath the larger pond is the 5-ft decrease in the surface level of this pond compared to the surface level of the smaller pond. The larger pond is actively dissolving the limestone bedrock (pH = 5.5), whereas the smaller pond more closely approaches equilibrium with the bedrock and the surficial glacial material (pH = 7.0). A model of cyclic solutioning and draining followed by self-grouting with glacial material explains the historical record of Rainy Lake's repeated draining and refilling.

D. MEDICAL SCIENCES

FIRST MORNING SESSION

DENNEY HALL ROOM 246

JOHN NEGULESCO, PRESIDING

8:45 WOMEN PHARMACY FACULTY MEMBERS: PROBLEMS AND OPPORTUNITIES
Metta Lou Henderson and Richard A. Ohvall, Raabe College of Pharmacy and Allied Health Sciences, Ohio Northern University, Ada, OH 45810 and School of Pharmacy, Oregon State University, Corvallis, OR 97331

An increasing number of women have selected pharmacy as a career during the past decade. Similar growth has been seen in the number of women pharmacy faculty members. This has resulted in an increasing interest in identifying their personal and professional characteristics. A survey questionnaire was mailed to all full time women pharmacy faculty members (194) as listed in the 1976-1977 Roster of Teaching Personnel in College of Pharmacy. Data from 123 responses (62.4%) was analyzed. The majority of the group (70.6%) was 35 years of age or younger. The respondents had been faculty members from 1 to 30 years, with 69.9% having taught 5 years or less. Fifty percent listed clinical pharmacy as their area of specialization. One-quarter possessed Doctor of Philosophy degrees, with another one-third holding a Doctor of Pharmacy degree. In addition to questions concerning tenure, non-teaching responsibilities, career satisfaction, role models, and encouragement of women students, the women were asked whether they were discriminated against (as compared to male colleagues), with regard to salary, promotion, teaching assignments, committee assignments, travel opportunities and office facilities. Although the greatest percentage felt they were not, comparison between rank and fields provides additional insight into these types of problems.

9:00 MORTALITY PATTERNS IN OHIO, 1969-1978. Nancy A. Reiches, Ph.D., The Ohio State University, Department of Preventive Medicine, 320 W. 10th Ave., Columbus, OH 43210.

Epidemiologic analyses of changes in mortality rates over time and differences in mortality between geographically defined regions often lead to testable hypotheses about disease causation and the effects of health care interventions on the occurrence and outcome of disease. The purpose of this study is to evaluate changes in mortality rates from cancer and cardiovascular disease (CVD) in Ohio from 1969 to 1978.

During the study years, age-adjusted mortality rates for all causes of death declined by 10.8% for white males and 15.1% for white females. This finding can largely be accounted for by significant decreases in death rates from CVD. The age-adjusted mortality rate for CVD among white males declined from 492.1 per 100,000 population to 380.0 (-22.8%); for white females, from 279.9 to 215.2 (-23.1%). During the same period, however, the mortality rate for cancer among white males increased 8.7% (from 204.6 to 224.4). Cancer mortality rates for white females were virtually unchanged (134.8 to 135.1). These opposing secular trends in cancer and CVD mortality consequently have altered the proportionate mortality accounted for by these leading causes of death. For example, in 1969, cancer accounted for 17.9% of all deaths among white females; by 1978, the proportion rose to 21.2%, although the rate of cancer deaths per 100,000 population remained the same.

More detailed analyses of these data reveal that the rates of change are not uniform:

1) across all age groups; 2) between urban and rural areas of the state; and 3) across individual neoplasms or diseases of the circulatory system. Inferences are drawn regarding general secular trends and particular differences with respect to demographic variables.

9:15 DEFINING PARENTAL ABUSE, Timothy Babinchak, Mark S. Hazen, Michael H. Linz, S. Steven Mehta, Northeastern Ohio Universities College of Medicine, J. Patrick Turbett, State University of New York at Potsdam, and Richard O'Toole, Kent State University, Kent, Ohio 44240.

The last three decades have witnessed the repeated "discovery" of family violence and the selection of new victims of abuse for public concern and research attention. Following child and wife abuse, most recently we have become aware of mistreatment of the elderly. This research explores the definitional standards which physicians employ to diagnose abuse of the elderly. Vignettes used in a major study of child abuse were modified to make the child the abuser of the old, dependent parent. Questionnaires were mailed to all physicians holding clinical appointments at a medical school (N=766) with a return rate of 30%. Physician standards are reported in terms of the following categories of abuse: uncleanliness, emotional neglect, inadequate housing, medical neglect, nutritional neglect, physical abuse, lack of supervision, and sexual abuse.

9:30 HEALTH CARE AND THE INTEGRATION OF THE NURSING HOME INTO THE COMMUNITY. David J. Fulton and Daniel L. Herriman, 4011 Greenmont Dr. SE, Warren OH 44484.

This research is an application of interorganizational relations theory (Klonglan, Paulson, and Rogers, 1972) to the integration of nursing homes into the community as a variable in providing health care. Tested is the hypothesis that nursing homes which are more integrated into the community provide better health environments. Data was collected from seven nursing homes and from their corresponding Medicaid/Medicare Program Eligibility Reports. The latter being used as health care indicators. Results support the hypothesis showing that greater total numbers of contacts, greater numbers of social contacts, and greater numbers of social-medical contacts correlate very well with better health care environments, (r=.488, r=.469, and r=.609, respectively). Concurrently, greater numbers of medical contacts correlate with poorer health environments, (r=-.104). The results are indicative of the value of volunteer programs in a nursing facility, the negative effects of a nursing home's rising dependence on outside agencies in the total care of the patients, and the underlying benefits derived by a nursing home in becoming a community active rather than a community passive agency amidst the spectrum of health care organizations.

9:45 THE EFFECTS OF AGE ON PHENOBARBITAL INDUCTION OF CYTOCHROME P-450. Robert Yeager and Dr. John F. Gwinn, Biology Department, University of Akron, Akron, Ohio 44325.

The biological half-life of many drugs increases when administered to older animals. Possible explanations include reduced renal elimination and reduced capacity of the liver to biotransform the drug via the cytochrome p-450 enzymes. Phenobarbital induces increased synthesis of p-450 enzymes in liver when a rat is exposed to this drug over a period of a few days. This study attempted to determine whether there is a change in the amount of p-450 induced by phenobarbital as a function of age.

The weight, protein concentration, and p-450 concentration of liver were measured in Wistar male albino rats of five age groups (2,4,7,9, and 12 months) to establish baseline data. The animals were anesthetized with 35 mg/kg pentobarbital and sleep times recorded. Phenobarbital was then added to the drinking water for six days and again the animals were challenged with 35 mg/kg pentobarbital. After measuring sleep time the animals were killed, livers perfused, weighed, homogenized, and centrifuged. The cytochrome p-450 fraction was analyzed for protein content and enzyme concentration was determined using carbon monoxide absorption with a differential spectrophotometer.

Phenobarbital treatment increased liver weight, protein and p-450 concentration when compared with controls in all age groups. Increased metabolism of pentobarbital was demonstrated by reduced sleeping time after treatment with phenobarbital. The data indicates reduction in the amount of cytochrome p-450 that can be induced by phenobarbital in older rats.

10:00 RELEASE OF CATECHOLAMINES BY SUCCINYLCHOLINE IN MAN. Lynne S. McCullough, M.D. Medical College of Ohio, C. S. #10008, Toledo, Ohio 43699

The hypothesis was tested that some adverse reactions to succinylcholine (sch) may be due to its nicotinic effect. If true, then sch-induced catecholamine release may precipitate the frequently observed hypertension and tachyarrhythmias with sch.

Seven premedicated adults were monitored by EKG and blood pressure cuff. Following intravenous and radial artery cannulation, anesthesia was induced with thiopental (4 mg/kg IV) and maintained with N_2O-O_2 (50-50) and halothane (1%-1.5%). Ventilation was assisted by mask. Orotracheal intubation was performed after disappearance of fasciculations. Arterial blood samples were collected 1) immediately prior to thiopental injection, 2) immediately prior to

sch injection, 3) two minutes after sch injection but prior to intubation, 4) one minute after intubation and 5) 10 minutes after sch injection. Samples were analyzed for potassium (ion specific electrodes), blood gases, norepinephrine and epinephrine (Peuler & Johnson radioenzymatic technique). In 5 of the 7 patients, results were similar. Sch, prior to endotracheal intubation, produced a significant rise in blood pressure and heart rate ($p < 0.05$). Mean increase in plasma potassium was 0.360 meq/l. Plasma epinephrine did not rise significantly. Mean plasma norepinephrine rose from 301.4 pg/ml to 490.6 pg/ml ($p < 0.005$). Of the remaining 2 patients, 1 had an eight-fold increase in plasma norepinephrine, and the other a ten-fold increase accompanied by bigeminy. Administration of sch causes an abrupt elevation of plasma norepinephrine. The increase may reach 1000% of normal and 7 times the measured exercise level. We conclude that this norepinephrine release contributes to the hypertension and tachyarrhythmias observed following sch administration.

10:15 EVIDENCE THAT DIFFERENT POPULATIONS OF NEURONS WITHIN SPECIFIC RETICULAR AND RAPHE NUCLEI INNERVATE SEPARATE AREAS OF THE CENTRAL NERVOUS SYSTEM. Waltzer, R.P. and Martin, G.F., Dept. of Anatomy, The Ohio State University, Columbus, Ohio, 43210.

The nucleus reticularis gigantocellularis and the adjacent raphe are known from HRP studies to innervate both the cervical enlargement of the spinal cord and the anterior lobe of the cerebellum. In order to determine whether neurons in those brain stem regions provide collateral innervation to both areas we employed the retrograde transport of fluorescent tracers in double-labelling experiments. Injections of True-Blue into the cervical cord of anesthetized rats were followed by injections of Nuclear-Yellow into the anterior lobe of the cerebellum 6 days later. The animals were sacrificed 24 hours or less after the second injection. The brains were removed, frozen on dry ice, and sectioned on a cryostat. The sections were examined with a fluorescence microscope using an excitation wavelength of 360nm. The cytoplasm of neurons labelled by True-Blue appeared deep blue, whereas the nuclei of neurons containing Nuclear-Yellow were yellow to silver. Double-labelled neurons contained both markers and were interpreted to have projections to both of the injected areas. The nucleus reticularis gigantocellularis and nuclei obscurus and magnus raphae contained neurons labelled only with True-Blue intermingled with neurons displaying only Nuclear-Yellow. A few double-labelled cells were observed. The intermingling of neurons within reticular and raphe nuclei which project to different targets suggest a greater heterogeneity in reticular connectivity than might have been expected. (Supported by BNS-80-08675.)

10:30 SURFACE LOCALIZATION OF CON A BINDING SITES ON FUSING AND NON-FUSING NEURAL FOLDS OF MOUSE EMBRYOS DURING NEURULATION: AN ULTRASTRUCTURAL, HISTOCHEMICAL STUDY UTILIZING THE PARTICULATE MARKER, COLLOIDAL GOLD. Virginia A.P. Zinsmeister, Ph.D, Department of Pediatrics/Newborn and Thomas W. Sadler, Ph.D., Department of Anatomy, University of Cincinnati Medical Center, Cincinnati, Ohio 45267. The Concanavalin A-Gold labeled horseradish peroxidase method has been employed in the localization of Concanavalin A (Con A) surface receptor sites on glutaraldehyde-fixed ICR mouse embryos. The number of gold particles per micron of cell surface was counted and subjected to statistical analysis. The neuroepithelial cells exhibited Con A binding; however, the extent of surface labeling was dependent on the stage of differentiation of the neural folds. Distinctive modifications in mean surface labeling density correlated with specific periods during the differentiation and maturation of the embryos and neurulation. These observations are discussed in relationship to methodology and to potential changes in number and/or spatial arrangement of Con A receptor sites, primarily attributable to mannosyl and/or glucosyl residues associated with membrane glycoproteins and/or glycolipids of developing neuroepithelial cells. In addition, our initial findings with the embryonic tissue attests to the value and reproducibility of Geoghegan and Ackerman's (1977) colloidal gold technique as a histochemical probe.

10:45 IMMUNE RESPONSES TO CANINE DISTEMPER AND MEASLES VIRUSES IN SERA AND CEREBROSPINAL FLUID OF MULTIPLE SCLEROSIS PATIENTS.
by Steven Krakowka, D.V.M., Ph.D., Department of Veterinary Pathobiology
The Ohio State University, 1925 Coffey Road, Columbus, Ohio 43210

Paired serum and cerebrospinal fluid (CSF) from multiple sclerosis (MS) patients and age-matched controls were examined for antibody to canine distemper and measles virus using an immunoprecipitation-polyacrylamide gel electrophoresis (PAGE) procedure. Subconfluent monolayers of vero cells were infected with each virus and pulsed with ^{35}S-methionine. Viral materials were harvested and reacted with serum and CSF. Complexes were precipitated with immobilized protein A, electrophoresed and analysed by autoradiography. Results obtained will confirm or deny the hypothesis that MS may result from a zoonotic infection by canine distemper virus.

D. MEDICAL SCIENCES

SECOND MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 262

8:30 TETRACYCLINE INDUCED INHIBITION OF SKELETAL GROWTH IN THE MOUSE (MUS MUSCULUS): A PRELIMINARY STUDY. Michael C. Mahaney. The Department of Anthropology, The Ohio State University, Columbus, Ohio 43210.

Currently accepted conclusions regarding the effects of tetracyclines on mammalian osteogenesis are both confusing and contradictory. The results of an in vivo study of the effects of tetracycline HCL on skeletal development in the embryonic and fetal mouse (Mus musculus) are presented. Virgin female mice, determined to be in estrous by vaginal smear inspection, were mated to virgin males. Females exhibiting vaginal plugs were considered to be pregnant and were entered into the experiment. Experimental dams received intraperitoneal injections of tetracycline HCL (100mg/kg body weight) while controls received injections of double distilled water. At birth, the neonates were weighed, terminated, skinned, eviscerated, and fixed. Their skeletons were stained for cartilage and counter-stained for bone. Birth weight, total bone lengths, and the lengths of calcified portions of the appendicular skeleton were recorded. Univariate and multivariate analyses of these data indicate that overall growth, amount and pattern of calcification, and litter size are significantly different in the control and experimental groups. These results support contra-indications for tetracycline use during mammalian pregnancies and question the advisability of pediatric administration in cases where linear growth is a criterion in the evaluation of patient status. Also, laboratory use of the antiobiotic as a florescent marker in studies of osteo-dontal growth may be inappropriate due to these growth inhibiting properties.

9:00 ADHERENCE OF PSEUDOMONAS AERUGINOSA TO TRACHEAL EPITHELIUM. H. Marcus and N. R. Baker, The Ohio State University, Columbus, Ohio 43210.

Adherence of mucoid and non-mucoid isolates of Pseudomonas aeruginosa to the tracheal epithelium of normal hamsters was studied using tracheal organ culture. Log phase growths of mucoid and non-mucoid isolates were adjusted to 10^7 cfu/ml in MEM-Hepes. Tracheal cultures were infected with the bacterial suspensions and duplicate tracheal rings were removed at 2, 4 and 6 hr. The rings were rinsed in order to remove non-adherent bacteria, fixed and prepared for observation by scanning electron microscopy. No adherence was observed at 2 hr, but by 4 hr extensive adherence of the mucoid isolates could be seen. A matrix of fibers surrounding the organisms was evident. The non-mucoid isolates did not adhere well to the tracheal epithelium. The prevalence of mucoid P. aeruginosa in cystic fibrosis may be due to the adherent properties of these organisms in an environment where there is increased concentration of mucous.

9:15 THE EFFECTS OF CHLORAMBUCIL IN DBA/1J MICE HAVING RaVe LYMPHOBLASTIC LYMPHOMA. Karen P. Eschedor, Raymond M. Gesinski. Department of Biological Sciences, Kent State University, Kent, OH 44242.

Chlorambucil (Lukeran®) is an alkylating agent of the nitrogen mustard type. Chemically it is p-(di-2-chlorethyl) aminophenylbutyric acid. Chlorambucil has been shown to be of value in the treatment of chronic lymphoproliferative diseases such as lymphocytic lukemia, Hodgkins disease, and malignant lymphomas. It was therefore chosen as the agent of study on the RaVe Lymphoblastic Lymphoma, which normally kills its host in 8-10 days. Chlorambucil is believed to damage cells about to divide and cells undergoing mitosis. Mature lymphocytes are also affected.

Mature male and female DBA/1J mice were administered 12.5 mg/kg chlorambucil orally and implanted with tumor. Serial sampling procedures were carried out starting at day 2 and going through day 17 post-implant and administration of chlorambucil. Each sampling consisted of qualitative and quantitative techniques on the bone marrow and peripheral blood. The marrow was obtained from the tibia-fibula and femurs of both hind limbs, and peripheral blood was drawn by cardiocentesis. Electronic Coulter counts and differential counts of these samples demonstrated a decrease in the lymphocyte population. These data were compared to that obtained using the same procedure on mice serving as controls receiving neither chlorambucil nor tumor, mice receiving chlorambucil only, and mice receiving tumor but not chlorambucil.

9:30 ALTERATIONS OF ACTIVITY PATTERNS IN LABORATORY RATS EXPOSED TO DIMETHYL AND TRIMETHYL TIN COMPOUNDS Scott M. Doran and Douglas H. Taylor, Miami University, Department of Zoology, Oxford, Ohio 45056

Forty day old male Sprague Dawley rats were exposed to 40.0 ppm and 1.0 ppm tin, in the form of Dimethyltin dichloride and Trimethyltin chloride respectively, through their drinking water for 24 days. On day 14 of exposure the animals were placed in a residential cage designed to monitor feeding, drinking, and locomotor activity. Animals exposed to Dimethyltin dichloride showed an increase in locomotor activity compared to controls while Trimethyltin chloride produced a decrease in locomotor activity in comparison to controls.

9:45 ON THE ANALYTICAL AND EXPERIMENTAL STUDIES OF HUMAN FEMUR. D. D. Raftopoulos, Ph.D. and J. D. Baril, M.D.; Dept. of Mech. Engr., Univ. of Toledo; Toledo, Ohio 43606

The ability of the intact and/or the fractured human femur to resist loads and provide a supporting frame work for the soft tissue is of great interest. Knowledge of the internal stresses is of major importance both for the location of the areas of greatest load from which fractures are likely to be initiated and for efficient design of implants and/or joint replacements. Furthermore, determination of the stress field in the femur necessitated knowledge of the various applied forces as well as the internal structure and the mechanical properties of the femur. A large number of studies of the aforesaid problem have been reviewed by the authors. The first section of this review is a thorough description of the internal structure of the femur. The second section deals with a description of the mechanical properties of the cortical and cancellous portions of the femur as they are determined from tensile, compressive, shearing, bending, torsion and impact tests. In the third section, the joint and muscle forces, acting on the femur are analyzed. Finally, in the fourth section the mathematical and experimental methods for the determination of the internal stress field in the femur are fully presented. The mathematical methods include use of the beam theory and finite elements, while the experimental methods incorporate brittle coating, photoelastic coating, strain gages and the two- and three-dimensional photoelasticity. Finally, an analysis of the strength characteristics of the femur from the fracture mechanics approach point of view is presented.

10:00 ORGANOTIN COMPOUNDS PRODUCE LEARNING DEFICITS IN YOUNG RAT PUPS. Elizabeth Noland and Douglas H. Taylor, Miami University, Dept. of Zoology, Oxford, Ohio 45056

Monomethyltin trichloride, dimethyltin dichloride and trimethyltin chloride exposure produces learning deficits in 11-day old and 21-day old rat pups. Rat pups exposed to low chronic doses of monomethyltin (12 mg/l in dams drinking water) exhibited reduced learning abilities in two different learning paradigms. Dimethyltin produced similar learning deficiencies at lower dosages (10 mg/l in dams drinking water). The same overall deficiencies was also observed in rat pups exposed to very low dosages of of trimethyltin (0.15 mg/l in dams drinking water). This study is illustrative of the sensitivity of behavioral tests in detecting the toxic effects of subclinical exposure to a class of heavy metals.

10:15 DEVELOPMENT OF AN IN VIVO BRAIN-GUT PEPTIDE MODEL. O'Dorisio, T.M., Yovos, J.G., Cataland, S., Carey, L.C. Ohio State University Hospital, Columbus, Ohio 43210

Studies elucidating what is now termed the "Brain-Gut" axis have been hampered by inadequate, large animal models. We report the development of an intracerebroventricular (ICV) appliance which allows for percutaneous peptide infusions (into the lateral ventricle), in the unrestrained, unanesthetized dog. The small (1.5 cm x 2.5 cm) two plate stainless steel appliance is secured through the bony based plate. The plates held a small teflon ball with an engraved funnel facing the skin and held above the stereotaxically determined lateral ventricle. A small burr hole is drilled through the bony plate allowing access of the teflon funnelled ball to an area directly above the lateral ventricle. Muscle and skin are closed over the positioned appliance and the dog is allowed two months recovery from the surgery. Having established that these animals tolerated the head piece well, a series of experiments was conducted to establish the model's ability in studying brain-gut peptide interrelationships. Three centrally infused peptides (given ICV) reported to effect peripheral glucose and insulin responses were used; insulin (500 μU), somatostation (50 μg), and bombesin (200 ng). ICV insulin effected a small (nonsignificant) decrease in peripheral glucose response. ICV somatostatin caused a significant lowering of peripheral insulin levels. This was associated with a concommitant rise in peripheral glucose concentrations. Bombesin (ICV) effected a dramatic rise in both peripheral glucose and insulin concentrations.
Our studies demonstrate the utility of this unique in vivo "Brain-Gut" peptide model.

LOW LEVEL LEAD (Pb) EXPOSURE PRODUCES LEARNING DEFICITS IN YOUNG RAT PUPS Douglas H. Taylor, Dept. of Zoology, Miami University, Oxford, Ohio 45056

10:30

Eleven day old Sprague-Dawley (CD strain) rat pups whose mothers were maintained on a 200 mg/l dosage of lead (Pb) acetate in their drinking water exhibited differences in a learning paradigm as compared to controls. No significant differences were noted between the control pups and the experimental pups with respect to acquisition rates but there were significant differences between the two groups with respect to extinction rates. Similar results were obtained in tests of rat pups whose dams had been maintained on a 400 mg/l dosage of lead (Pb) acetate. These data indicate that low level lead (Pb) exposure can induce significant behavioral deficits in young rat pups.

D. MEDICAL SCIENCES

FIRST AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 246

JOHN NEGULESCO, PRESIDING

1:30 BUSINESS MEETING

COMPUTER SIMULATION AND ANALYSIS OF FIRST-TRANSIT CARDIAC RADIONUCLIDE DILUTION CURVES. Larry R. Low, University of Toledo, Toledo, Ohio 43606.

2:00

A discrete time, lumped parameter mathematical model of the human cardio-pulmonary circulation as it appears during first-transit radionuclide dilution studies has been developed. Eleven chambers and four delays were modeled including the entire circulation from an input chamber (before the vena cava) to an output chamber (after the aorta). The 26 transfer paths (each associated with a parameter) included forward and reverse flow through the heart valves, backflow from the atria into the veins, and five types of shunts. Using computer simulation, a table has been developed which shows the chambers from which data are necessary in order to obtain estimates of the various parameters. An optimal fitting routine has been developed to estimate the parameters from patient data using a least squares, iterative fitting algorithm. The model may use an input function derived from the patient study, allowing the radionuclide to be injected peripherally. A method of modeling continuously variable delays with only discrete time sample points was devised to allow model-data synchronization. Region of interest (ROI) selection for curve generation was augmented by using TMAX functional images. Separate ROI's were used for end-systolic and end-diastolic data acquisition. A method of scaling the data from the various chambers to account for variable radiation attenuation in the body was devised. Calculation of relative volumes and volume transfers throughout the system was based upon the transfer parameters. This research may provide the field of medicine with a method of estimating many parameters of heart function using a single, simple, safe and rapid procedure.

HEMATOLOGIC EFFECTS OF DIETARY ZINC AND EDTA ADMINISTERED TO MICE PRE AND POST-NATALLY. R. B. Taylor, Department of Biological Sciences, Kent State University, Kent, Ohio, 44242.

2:15

Zinc is essential for normal growth and in wound healing. EDTA (ethylenedicemine-tetraacetic acid) is a chelating agent and is used widely as a food additive to prevent development of rancidity and discoloration. Pregnant albino Swiss Webster mice were divided into six experimental groups according to the following dietary format: (1) Zinc normal (2) Zinc normal + EDTA (3) Zinc enriched (4) Zinc enriched + EDTA (5) Zinc deficient (6) Zinc deficient + EDTA. Neonates from non-EDTA parents and zinc enriched parents exhibited the highest mean body weight at birth. Among the EDTA treated group, the zinc enriched group exhibited the highest mean weight, indicating a possible protective role of zinc. Progeny from zinc deficient + EDTA parents had the highest total white blood cells in the first week. Groups with additional dietary zinc had increased packed cell volume. Physiologically, progeny from zinc deficient parents had no hairs for the first two weeks.

2:30 DECREASED MORTALITY OF INFANT RABBITS FED SPECIFIC ANTI-CHOLERA TOXIN (CT) BOVINE COLOSTRAL IMMUNOGLOBULINS (IMMUNE BCI). Richard McClead, Susan Gregory, Ohio State University, The Children's Hospital, 700 Children's Drive, Columbus, Ohio 43205.

In this report, we provide evidence that orally-administered, specific anti-CT BCI resist digestion and provide passive immunoprotection.

Methods: Immune BCI were isolated from colostrum of immunized cows and characterized by immunochemical techniques. Litters of 3-5 day old infant rabbits were randomly assigned to three groups and fed 9 ml in 24 hours of either immune BCI (n=14), non-immune BCI (n=7), or 5% glucose water (D5W, n=17). 4-6 hours after completion of the last feeding, all animals were anesthetized. The distal ileum of each animal was ligated and inoculated with 100 ng of CT. Some animals were injected with 1 cc of saline as negative controls (n=6). 18 hours after injection, mortality rates were noted. The fluid accumulation index (FAI=gm intestinal fluid/gm intestinal weight) was calculated for surviving animals.

Results: The immune BCI had ≈ 2.65 mg/ml anti-cholera toxin (IgG_1) antibody. The mortality rate of CT-injected, immune BCI-fed rabbits (14.3%) was statistically the same as saline-injected controls (0%), but significantly less than rabbits fed non-immune BCI (100%) or D5W (82.4%), $p<0.001$. The FAI ($\pm$ SEM) of CT-injected, immune BCI-fed rabbits and saline-injected controls was 1.09 ± 0.15 and 0.98 ± 0.23 (NS). The FAI for CT-injected, D5W-fed rabbits was 1.87 ± 0.33 (n=3).

Conclusion: Orally-administered immune BCI appear to remain functionally active in the infant rabbit gastrointestinal tract and are capable of providing passive immunoprotection as evidenced by the reduced mortality and fluid response after direct intestinal injection of 100 ng CT.

2:45 AN IMMUNOLOGICAL CLASSIFICATION OF THE RaVe TUMOR. S. A. Hite, R. T. Heath, R. M. Gesinski. Department of Biological Sciences, Kent State University, Kent OH 44242.

The RaVe lymphoma, previously classified as a lymphoblastic lymphoma is apparently of T cell origin. Modern concepts of immunology distinguish two major classes of lymphocyte, thymus dependent (T) lymphocytes and thymus independent (B) lymphocytes, which differ functionally. The application of these immunological concepts to the classification of lymphoma have improved their prognostic value, and have allowed some understanding of the disparity of these neoplasms. Histochemically the RaVe tumor is acid phosphatase positive and ATPase negative. Surface membrane studies indicate that surface immune globulin (SIg) and erythrocyte-antibody-complement (EAC) receptors are not present. These findings suggest a T cell origin for the RaVe lymphoma.

3:00 NATURE OF A NON-ANTIGENIC TUMOR INHIBITOR.

David Williamson, Mathe M. Ndungo-Sokul, and Leo G. Nutini
St. Thomas Institute, 1842 Madison Road, Cincinnati, Ohio, 45206

It has been shown that both normal and neoplastic cells contain substances, some of which stimulate and some of which inhibit tumor cell division. Non-antigenic fractions, when injected locally in human beings, cause the regression of a variety of epithelial tumors without injuring the contiguous normal tissues. This paper is concerned with more definitely characterizing the nature of the tumor-inhibiting substance which caused the regression of human and laboratory animal tumors.

3:15 THE EFFECT OF SELENIUM COMPOUNDS ADMINISTERED IN-OVO ON THE VIABILITY OF THE CHICK EMBRYO. John M. Delphia and Daniel Couri. Departments of Anatomy and Pharmacology, College of Medicine, The Ohio State University, Columbus, Ohio, 43210.

Selenium in the diet is known to cause selenium poisoning, decreased rate of growth and decreased reproductive abilities in animals. The present study is concerned with the effect of selenium salts on the viability of the embryo. Sodium selenite (Na_2SeO_3) and sodium selenate (Na_2SeO_4) were administered in-ovo to pre-incubated fertile chick eggs. The selenium compounds were delivered in 20 micro-liters of sterile HOH or saline. Dosages of each selenium compound ranged between 1 microgram and 200 micrograms. Controls received 20 micro-liters of sterile HOH or saline. The injected, fertile white leghorn chicken eggs were incubated at one hundred degrees Fahrenheit and sixty-four percent relative humidity for five days (one hundred-twenty hours) in a rotary-type incubator.

Both sodium selenite and sodium selenate increased the percent mortality significantly ($P > 0.05$ or greater) using the Chi Square Method. These increases in mortality were dose-dependent in both selenium groups. The effect on mortality was similar for each dosage group in the two selenium treatment groups. The lowest dosage in either treatment group that resulted in increased mortality was 25 micrograms/egg.

THE ESTRADIOL SULFOTRANSFERASE OF RAT LIVER-Jacalyn M. Green and Sanford S. Singer University of Dayton-Dayton, Ohio 45469

3:30 The importance of estrogen sulfates has been recognized in their involvement as storage forms of hormones and in other biological processes. The efforts of the study described here have been directed towards accurate preliminary characterization of the properties of the enzyme, estradiol sulfotransferase, in rat liver cytosol that sulfates estradiol. A quantitative estradiol sulfotransferase assay was designed in which optimum substrate and coenzyme concentrations, time course limitations, and a useful protein range were determined. Freshly prepared cytosol was then fractionated on DEAE Sephadex A-50 columns. The elution profile of the columns was examined to locate the estradiol sulfotransferase activity and column fractions containing the majority of this enzyme activity were pooled. The kinetic properties of the pooled enzyme were examined. On the basis of this study the enzyme assay designed for use with cytosol was modified to optimize it for use with the estradiol sulfotransferase pool. Optimum pH, molecular weight, substrate specificity, and coenzyme specificity were then studied with the pooled enzyme. The enzyme reaction product was identified by thin layer chromatography, electrophoresis, and glass fiber chromatography.

THE ROLE OF FREE-RADICAL INHIBITORS ON ACETALDEHYDE-INDUCED INCREASES IN LIPID PEROXIDATION. T. E. Stege, S. Mischke, G. W. Cox and C. R. Reider, Department of

3:45 Zoology, Ohio Wesleyan University, Delaware, Ohio 43015.

Although the cause of ethanol-induced liver cell injury remains unknown, one theory proposes the process of lipid peroxidation. Lipid peroxidation involves the free radical attack and damage of the lipid membranes within the cell. Initial research in our laboratory demonstrated acetaldehyde, a metabolite of ethanol, generates significant increases in lipid peroxidation in both rat liver microsomes and isolated liver cells. Subsequent research attempted to evaluate various free radical inhibitors in terms of their effect on the acetaldehyde-induced increase in lipid peroxidation. Lipid peroxidation was evaluated utilizing measurements of chemiluminescence and malonaldehyde levels in isolated rat liver microsomes incubated in the presence of acetaldehyde. Acetaldehyde-induced (40mg%) increases in chemiluminescence and malonaldehyde were significantly reduced by the free radical scavengers Vitamin E (200mg%) and Promethazine (25mM). However, inhibitors of hydrogen peroxide (Catalase, 10mg%), superoxide anion (Superoxide Dismutase, 60 units/ml) and hydroxyl radicals (Mannitol, 100mM) did not significantly reduce acetaldehyde increases in both chemiluminescence and malonaldehyde. Incubation with the singlet oxygen inhibitor Triethylenediamine (DABCO, 20mM) did significantly reduce the acetaldehyde-induced increases. These results indicate that acetaldehyde-induced elevations in malonaldehyde and chemiluminescence appear to be related to the generation of singlet oxygen radicals rather than involving either superoxide, hydrogen peroxide or hydroxyl radicals.

THE EFFECT(S) OF LITHIUM CARBONATE ON EPIPHYSEAL CARTILAGE LAYERS OF INTACT AND FRACTURED RADII IN DOMESTIC FOWL. Alexander, Keith and John A. Negulesco, The Ohio State University, Anatomy Department, Columbus, Ohio 43210

4:00

The effect of lithium, calcium and magnesium on the fracture healing process in developing osseous tissue has not been adequately investigated. Ninety-six Hubbard ♂ chicks were divided at hatch into 4 groups of 24 birds; control, lithium, calcium and magnesium treated groups. At 7 days post hatch (DPH) each respective group began receiving 1 p.o.q.d. (syringe) of 0.2 ml saline, 1.6 mg Li_2CO_3/0.2 ml saline, 1.8 mg $CaCO_3$/0.2 ml saline, or 2.2 mg $MgCO_3$/0.2 ml saline. At 14 DPH the right radius of each chick was fractured, the left radius serving as control. At 35 DPH 24 animals were sacrificed, the radii were dissected free, fixed (10% BNF), decalcified, doubly embedded, and sectioned (7-9μm) for histological examination. The mid-coronal heights of the proximal epiphyseal cartilage layers of control and treatment groups were measured with a computer based image analyzing system (Videoplan) and their mean values were analyzed for significance (Scheffe-Dunnett tests, $p<0.05$). In the intact bones, Li_2CO_3 significantly increased growth (SIG) of the proliferating and calcified layers and significantly decreased growth (SDG) of the hypertrophic layer. Magnesium showed a SIG in the calcified layer and a SDG in the hypertrophic layer. Calcium showed a SIG in the articular, prehypertrophic and calcified layers. In the fractured bones, lithium and magnesium showed a SIG in the proliferating and calcified layers and a SDG in the articular and hypertrophic layers. Calcium SIG of the calcified layer and SDG of the articular and hypertrophic layers.

THE EFFECT(S) OF LITHIUM AND CALCIUM CARBONATE ON THE CARTILAGE LAYERS OF THE PROXIMAL AND DISTAL EPIPHYSES OF DEVELOPING CHICKS. Lozanoff, Scott and Negulesco, J.A.

4:15 The Ohio State University, Anatomy Department, Columbus, Ohio 43210

Seventy-two Hubbard male chicks were divided at hatch into 3 equal groups of 24 birds, control, lithium and calcium treated groups. Each respective group received 1 p.o. q.d. (syringe), 0.2 ml saline, 1.6 mg Li_2CO_3/0.2 ml saline or 1.8 mg $CaCO_3$/0.2 ml saline. Six animals per group were sacrificed at 7 day intervals over a period of 4 weeks. Tibiae were dissected free, fixed (10% BNF), measured (Metric calipers), decalcified, doubly embedded, sectiond (7-9μm) and processed for histological measurements. A battery of 11 osteometric traits was subjected to a principal component analysis in order to ascertain size and shape growth

relationships. Growth trends exhibited by control and lithium treated specimens maintain similar size-shape relationships although the specific points of rapid size increase and shape change differs with Li_2CO_3 by the 4th week. Supplemental calcium, as expected, resulted in a general tibial size-shape growth relationship functionally different from controls. Analysis of the mid-coronal histological measurements revealed that lithium, at 14 days post hatch (DPH), had a significant but limited effect on the growth in height (GI) of the cartilage zones of the (PE) proximal (increased prehypertrophic and decreased degenerative, P<.005) and (DE) distal epiphyses (decreased degenerative, P<.05) while calcium suppressed GI of the degenerative cartilage zone of the DE (P<.05). At 35 DPH lithium and calcium stimulated GI of the degenerative cartilage zone of both epiphyses (P<.005) while lithium alone increased GI of resting, proliferative, prehypertrophic and degenerative zones of the PE (P<.05).

4:30 **SEQUENTIAL** INDUCTION OF DIABETES MELLITUS BY STREPTOZOTOCIN AND HYPOTHYROIDISM BY THIOURACIL:METABOLIC CONSEQUENCES J.K.Skibski and L.A.MESERVE Department of Biological Sciences, Bowling Green State University,Bowling Green,Ohio 43404

Streptozotocin (SZ) is a broad spectrum antibiotic capable of inducing diabetes mellitus in mice. When added to the diet the goitrogen thiouracil promotes thyroid hyperplasia. Decreased production of thyroid hormone results from thiouracil induced hypothyroidism. The present study examines metabolic status of SZ induced diabetes and hypothyroidism. Five metabolic conditions were tested examining mice injected or not injected with SZ, and fed normal or thiouracil diet. Metabolic condition was assessed by determining circulating levels of glucose,glycosylated hemoglobin(%HbA_{1C}), thyroxine(T_4), and insulin. Circulating levels in control mice were: glucose-90mg/dl; %HbA_{1C}-3.4%; T_4-3.9ug/dl; and insulin-26uU/ml. Four weeks after administration of SZ (175 mg/kg i.p.), mice had elevated glucose and HbA_{1C} levels (419% and 91% respectively). After feeding thiouracil (Thio,0.25% w/w) for 4 weeks, T_4 levels were decreased and insulin levels were increased. Thio was given 2 weeks after SZ, mice developed hyperglycemia although insulin levels were increased. Similar results were found if Thio was given 2 weeks before SZ. These results confirm that SZ produces diabetes and that Thio induces hypothyroidism. Thio alone also elevates insulin levels. Animals with both conditions demonstrate hypothyroidism, hyperglycemia, and hyperinsulinemia.

4:45 "NON-SATURABLE UPTAKE" ; FACT OR FICTION? Richard H. Matthews. Dept. Physiological Chemistry, 1645 Neil Ave., Columbus, Ohio 43210.

The possible existence of a "non-saturable uptake" system for amino acids in ascites tumor cells has been suggested by the laboratory of Christensen and coworkers in recent years. This has been used as an explanation for the residual uptake of system A-specific analogs in the absence of sodium ion. Our laboratory has found that saturable uptake of system A-specific analogs occurs from sodium free media. We have also noted that K_m values are increased in this circumstance, which could create the impression of a "nonsaturable uptake" in this circumstance. We now generate ideal data from the expression $v=(0.30xC_o)/(0.10+C_o)+(12xC_o)/(10+C_o)$ representing two hypothetical saturable systems(with parameters reasonable for systems A and L). Applying the method of Christensen and coworkers to this theoretical data we obtained a k_D value of 0.11 min^{-1}, although no "nonsaturable uptake" was incorporated in the generation of this data. This value resembles values for "nonsaturable uptake" reported earlier by Christensen and coworkers.

Supported in part by the Roessler Memorial Scholarship Fund.

D. MEDICAL SCIENCES

SECOND AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 262

1:30 BUSINESS MEETING, DENNEY HALL 246

SYMPOSIUM ON BIOMEDICAL ENGINEERING

2:00 ANALYSIS OF THE FIRST HEART SOUND IN ORDER TO CHARACTERIZE ITS WAVEFORM. Rhonda L. Roberts and Herman R. Weed, BioMedical Engineering Center, The Ohio State University, 2015 Neil Avenue, Columbus, Ohio 43210

The objective of this paper is to characterize the digitized heartsound signal obtained externally from dogs. The digitized data resulted from research carried

on primarily at the Institute of Biocybernetics of The University of Karlsruhe, West Germany by G. Vossius, K. Meyer-Waarden, H. Kwee, and by H. R. Weed of The Ohio State University. The investigation is directed at determining if any diagnostic physiological parameters; i.e, dp/dt max., valve openings, cardiac output, etc. are encoded within this heartsound signal by analyzing its characteristics - amplitude, frequency, phase, and time-dependent frequency variation - individually and in varying combinations. It is hoped that these characterizations may in the future be applied to non-invasive diagnosis of heart parameters and defects.

2:15 FAST HYBRID SIMULATION OF CARDIAC ELECTRICAL ACTIVITY. T. J. Kraus, J. Duerk and R. Wilson, BioMedical Engineering Center, The Ohio State University, Columbus, Ohio 43210

Depolarization of heart mass is determined with a conduction path and volumetric tissue matrix model. The depolarization phase of each cubical array segment of heart tissue is determined to enable a multi-point wavefront analysis, prediction EKG through vectorial addition. Physiological effects on action potential generation and time delay are continuously available on a unique circuit with analog computer control. Action potentials are read at the hybrid interface as magnitude and phase inputs to the volumetric solution. Resulting savings in digital calculation time allows the matrix solution to operate at high speed, with new applications in disease diagnosis, arrhythmia detection, and real time simulation.

2:30 NON-INVASIVE DIAGNOSTIC METHODS OF CEREBROVASCULAR DISEASE: J.P. Hayes and W.E. Evans, 1450 Hawthorne Avenue, Columbus, Ohio 43203

There are two main types of instruments for the non-invasive diagnosis of cerebrovascular disease: those instruments that assess the carotid bifurcation indirectly.

Some examples of instruments that indirectly assess the bifurcation include the Ocular Cerebrovascular Monitor (OCVM) and the Ocularplethysmograph (OPG). The OCVM assumes that a lesion in the internal carotid will decrease the systolic pressure in the opthalmic artery. Based on this information, a diagnosis of the extent of the disease is made. The OPG assumes that a lesion in the internal carotid artery will delay pulse arrival time to the orbit. Based on the extent of the delay, a diagnosis is again made.

Examples of the instruments that directly assess the bifurcation are the Ultrasonic Arteriograph (UA) and the Carotid Phonoangiograph (CPA). The UA is composed of a five MHz pulsed doppler, position sensing arm and scope screen by passing the ultrasonic transducer over the area of examination. CPA employs a microphone that amplifies bruits and displays them on an oscilloscope. The oscilloscope allows visual evaluation by the technician and provides a permanent photographic record.

These non-invasive techniques will be explained in detail.

2:45 HYBRID DATA ACQUISITION OF LOW VOLTAGE CELL GENERATOR POTENTIALS. Ralph H. Wilson, BioMedical Engineering Center, The Ohio State University, 2015 Neil Avenue, Columbus, Ohio 43210

Hybrid data acquisition improves low voltage signal separation and recording, then allows better insight to experimental results through digital filtering. Very low voltage, noisy, and drifting signals from generator potentials of nerve cells have been recorded and filtered. A high gain weighted variance analog filtering circuit is used to remove base line drift with low noise injection, and provide stable signal for analog to digital conversion. Results from several digital filtering techniques are discussed. Speed and flexibility of digital data storage, recovery, and statistical treatment give new power to empirical data analysis.

3:00 PLANNING THE ORGANIZATION AND TRAINING FOR BIOMEDICAL ENGINEERING TECHNOLOGY PERSONNEL AND FACILITIES IN HEALTH CARE SYSTEMS. H. R. Weed, BioMedical Engineering Center, The Ohio State University, Columbus, Ohio 43210

A major problem exists in establishing the proper educational program to provide the breadth of technological and medical understanding and expertise required by those directly involved in the use of technology in health care. The levels and emphases of these programs, their implementation in both developed and developing countries, and their evaluation are of critical concern.

It is the objective of this paper to specify function, outline programs, and suggest evaluation techniques for the programs of education, training, and operation necessary to support the required technology component of modern health care systems.

The paper considers the need based on the requirement of competency in both engineering and life science. Different emphasis is explored for the four categories of technology - person interface: user, maintainer, specifier, and purchaser. Four basic components of a complete program are identified and detailed; the high technical level engineer, the specific skill technician, the user paramedic and nurse, and the level of general understanding required of the physician.

Problems and examples of developing such programs are discussed relative to developing Third World countries, well advanced developing countries, and industrial developed countries with examples of ongoing programs at all three levels.

3:30 A DISPLAY SYSTEM FOR THE MAGNETIC FIELD REMOTE POSITION AND ORIENTATION SENSOR (CATHETER POSITION AND ORIENTATION SENSOR). N. Wali, BioMedical Engineering Center, The Ohio State University, Columbus, Ohio 43210

The catheter position sensor consists of two parts: the magnetic source assembly and the magnetic sensor assembly. The source is a specially designed electromagnet whose radial component goes through an abrupt reversal along the orthogonal axis. The sensor, which sees the radial component, is a miniature coil mounted at the tip of the catheter.

The magnitude of the radial compenent varies with angular variation from the orthogonal axes. The location of the sensor is made along the x, y and z axes for its different angular positions. These magnitudes will be plotted and analyzed (by using such techniques as multivariate analysis) to determine the position and orientation of the sensor.

4:00 DYNAMIC SPECTRAL ANALYSIS OF THE MYOELECTRIC SIGNALS DURING DOWNHILL FATIGUING EXERCISE. Aly A. Farag and R. M. Campbell, BioMedical Engineering Center, The Ohio State University, 2015 Neil Avenue, Columbus, Ohio 43210.

During prolonged downhill walking on a treadmill, real time analyses were performed for some metabolic data (ventilation rate, oxygen consumption rate and the heart rate) as well as the myoelectric signal of the tibialis anterior muscle.

For the 8 subjects who participated in the study, it was found that: the median frequency of the signal spectral density function increased from its initial value during the first few minutes of exercise then underwent a significant decrease of about 20%. The metabolic parameters showed little or no change after a few minutes of exercise. When the subjects' maximal voluntary contraction was measured after exercise, it was found that it decreased by 20-40% from its pre-exercise value. The amplitude of the signal was shown to decrease after the first few minutes of exercise and throughout the remaining duration. Muscle soreness was felt by all subjects 24-48 hours after the exercise.

The decrease in the amplitude of the signal and in the maximal voluntary contraction was attributed to reductions in the number of active motor units with the exercise. Spectral shift with fatigue is related to conduction velocity changes. Finally the behaviour of the metabolic parameters was attributed to the characteristics of negative work which requires less energy.

4:30 ELECTRICAL CONTROL AND SIGNAL SIMULATION OF CARDIAC CONDUCTION. J. L. Duerk and T. J. Kraus, BioMedical Engineering Center, The Ohio State University, 2015 Neil Avenue, Columbus, Ohio 43210.

In summary, this paper will present the physiological basis and a model electrical circuit (with experimental results) which exhibit the comprehensive electrical signal activity of the heart. The paper includes the action simulated potential waveforms of various fibers and tissues in the heart, along with ECG waveforms under various conduction defects. The model demonstrates variable inherent rhythmicity of these tissues along with overall heart rate control under normal, and pathological conditions.

E. PHYSICS AND ASTRONOMY

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 208

EDWARD S. FOSTER, PRESIDING

A RELATIVISTIC OPTICAL POTENTIAL APPROACH TO ANTIPROTON-NUCLEUS SCATTERING.*
B. C. Clark, The Ohio State University, Department of Physics, Columbus, Ohio 43210

9:00 The elastic scattering of antiprotons from nuclear targets is discussed within the framework of a Dirac equation based optical model. The optical model considered consists of Lorentz scalar and Lorentz vector contributions. Such a model has been successfully used to describe nucleon-nucleus elastic scattering experiments over a wide energy range.[1] G-parity arguments are applied to obtain an antiproton nucleus optical potential. Model calculations which include the effects of various annihilation potentials will be presented.

*Supported in part by the NSF under Grant No. PHY-8107397.

[1]L. G. Arnold, B. C. Clark, R. L. Mercer, and P. Schwandt, Phys. Rev. C 23, 1949 (1981) and references therein.

STAR FORMATION IN SPIRAL GALAXIES. M. Kaufman, The Ohio State University, Department of Physics, 174 W. 18th Avenue, Columbus, Ohio 43210

9:15 In some galaxies, hot young stars tend to concentrate in symmetrical spiral arms. Several theories have been proposed in the literature to explain this phenomenon. In the density-wave theory, the rate of star formation is higher in the region where the interstellar gas is compressed by a spiral density wave. In the stochastic theory, on the other hand, spiral structure results from sporadic and sequential star formation in a differentially rotating galaxy.

In this paper I evaluate these theories by using the observed distributions of young stars and interstellar gas in several spiral galaxies (our galaxy, M33, and M83). For example, the width of the H I spiral arms in M33 is smaller than predicted by the stochastic theory. Also the radial gradient in the distribution of giant H II regions (massive complexes of young stars) agrees with predictions of density-wave theory but is steeper than the gradient predicted by stochastic theory. However for smaller H II regions (less massive clusters of young stars), the radial and angular distributions in the plane of the galaxy differ from those of giant H II regions and are better explained by a stochastic theory. I conclude that a combination of the above two theories will provide a better explanation of star formation in spiral galaxies than either theory can provide by itself.

PHOTOMETRIC MOLECULAR INDICES IN WARM CARBON STARS. Sandra B. Yorka. Denison University, Granville, Ohio 43023.

9:30 Warm carbons stars have been investigated with narrow-band photometric systems designed to measure band strengths of NH, CN, CH, and C_2, and the color temperature. Model atmospheres of R stars, computed by Dr. H.R.Johnson and Dr. B.Gustafsson, are used to interpret the observed molecular indices in terms of elemental abundances. A differential analysis of the observed molecular indices for R, CH, CH-like, and barium stars as compared to G and K giants reveals that the barium stars have slightly higher C/O ratios than normal field giants and, though they are N-enriched with respect to the sun, they generally are not as N-enriched as the field giants. On the basis of the limited data available, the nitrogen abundances of the R stars appear slightly lower than those of normal giants; four out of five CH stars studied have nitrogen enrichments lower than those of the field giants. The C/O ratios of the R stars are generally higher than those of the CH stars.

A comparison of the photometry with model atmospheres shows the models represent well the energy distribution of the R stars in the near IR, but are underblanketed in the UV. This discrepancy appears to be similar to that found for models of G and K giants.

By matching theoretical and observed molecular indices we find the R stars to have nitrogen abundances somewhat lower than those of the giants. The observed C_2 indices cannot be reproduced theoretically by severely C-depleted models even if the C/O ratio is as high as six. The C_2 indices can be satisfactorily matched by models having solar or greater than solar C abundances.

INVESTIGATIONS ON KÀRMÀN VORTEX STREET FOR FLOW PASSED A HEATED CYLINDER AT LOW REYNOLDS NUMBER

9:45 By Tharwat M. Sallam*
Akiharu Mitsunaga**
* Alexandria University, Faculty of Engineering, Alexandria, EGYPT

Computational and experimental investigations on the formations and nature of Kàrmàn vorticies for a horizontal flow passing a circular cylinder were carried out. The effect of buoyancy force disturbances as well as the temperature distribution on the flow were studied. The cylinder surface temperature was heightened and the energy equation was solved.

A numerical method was applied to solve for the flow vorticity, stream function and temperature distribution behind the cylinder, by the use of both alternating direction impilicit method (A.D.I) and successive over relaxation technique (S.O.R). At the same time the flow was experimented and visualized by means of Mach-Zehnder interferometer.

The flow on the circular cylinder was deformed and unsteady Karman-like-vorticies were created. The numerically time iterated results have revealed unsteady density lines which are similar to the experimental contour fringes.

* On leave, Alexandria University, Egypt
** Osaka University

MELTING OF ICE SPHERES IN FLOWING WATER, G. S. Jakubowski, V. Eskandari and T. G. Keith, University of Toledo; Dept. of Mech. Engr., Toledo, Ohio 43606

10:00 A great deal of attention has been recently directed toward the towing of icebergs for fresh water utilization. One of the problems associated with iceberg towing is the lack of understanding of the melting phenomenon. Therefore, the melting of ice in flowing water was experimentally investigated in the laboratory. Spherical ice was selected for geometric simplicity. Different ice sphere diameters over a wide variety of water flow velocities were tested and resulted in a range of Reynolds numbers between 200 and 35,000. From the experimental results, it was found that the Reynolds, Nusselt and Prandtl numbers are the important non-dimensional variables. Furthermore, it was found that at low Reynolds numbers (R_e < 1600), natural convection is the predominant mode and the heat and mass transfer is independent of the flow velocity. At higher Reynolds numbers (R_e > 1600) forced convection predominates and an empirical power-law relationship exists between the Reynolds and Nusselt numbers such that

$$N_u = 0.0538\ R_e^{0.729}\ P_r^{0.67}$$

Even though the results are not directly applicable to irregularly shaped icebergs, it nevertheless provides an important first step toward iceberg utilization.

ELASTIC WAVES EXCITED BY MAGNETOELASTIC INTERACTION IN MAGNETIC GARNET FILM-SUBSTRATE SYSTEM[a)]

10:15 R. J. Yeh, P. E. Wigen and H. Dötsch[b)]
Physics Dept., Ohio State University, Columbus, Oh. 43210

Magnetoelastic excitations with a fine structure in the 50kHz range have been discovered in the study of the domain wall resonance (DWR) in the magnetic garnet thin films. The transversal elastic waves are excited in the magnetic garnet films (thickness~5 μm) by the DWR and propagate across the thickness of the film/substrate system to form standing waves. The resonance frequency of these standing waves are f=nv/2t, where f is the frequency, n is an interger, v=3.5x10^5 cm/sec is the transversal velocity of the elastic wave, and t=0.05 cm is thickness of the film/substrate system. A fine structure associated with each of these modes was observed to have a peculiar behavior. These fine structure modes have been identified as two dimensional bulk elastic waves by using a set of parallel microstrip lines. The dispersion relation of these eleastic waves is $\omega^2=v^2(k_1^2+k_2^2)$, where ω is the radial frequency, k_1 and k_2 are the wave vectors in the orientation perpendicular and parallel to the sample surface respectively. In the case of $k_1>>k_2$, $\omega/v=k_1+k_2^2/2k_1$, or $f=f_0+v^2k_2^2/f_0$, f_0 is the resonance frequency with $k_2=0$. The experimental results have excellent agreement with this model. The linear dispersion, which was observed when using a shorted slot-line structure, is understood as the excitation of only certain modes due to the complex structure of the slot line. a)Supported in part by NSF Grant # DMR 78-10300.b) Philip Res. Lab., D-2000 Hamburg 54, FRG.

LOW TEMPERATURE STUDIES OF THE DOMAIN WALL RESONANCE IN $CrBr_3$ E. Jedryka, R. J. Yeh, M. Ramesh, P. E. Wigen Department of Physics, The Ohio State University, 174 W. 18th Avenue, Columbus, Ohio 43210

10:30 Below 32K $CrBr_3$ is a Heisenberg ferromagnet. The easy axis of magnetism is parallel to the hexagonal c-axis, which is normal of the graphite-like crystal platelets. The domain structure is of the stripe type, with a period of a few microns. Using the vapor phase technique, thin (50 μm) platelets were grown, having diameters of 3-5 mm. Domain wall resonance was observed over the frequency range 250-1500 MHz using a shorted slot line and studied as a function of temperature between 4.2 K and the Curie point, as the magnetic field was varied between 0 and 6 kOe. The resonance frequency is strongly dependent on the sample thickness whereas the temperature induced changes are not significant. As the temperature increases, the linewidth increases very sharply. The resonance frequency is well described by the parallel stripe model considering a restoring force density generated by the magnetic domain structure and a domain wall mass density evaluated from the wall structure. The temperature stability of the resonance frequency indicates that the restoring force constant varies with temperature in the same manner as does the wall mass density.

E. PHYSICS AND ASTRONOMY

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 208

EDWARD S. FOSTER, PRESIDING

1:30 BUSINESS MEETING

F. GEOGRAPHY

FIRST MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 259

MARY ELLEN MAZEY, PRESIDING

8:30 GEOPOLITIK: DOCTRINE OF WAR-DOCTRINE OF PEACE. Pete Joyce, Dept. of Geography, Miami University, OH 45056

Geopolitik is a political and deterministic view which concerns itself with the explanation of how and why a state changes in its political or geographical structure. This is distinct from political geography, as political geography is concerned with observation and analysis of the static order and is not prescriptive. This paper examines the foundations of Geopolitik in Germany from 1850 to 1945. The emphasis is on the growth of the philosophy of Geopolitik after World War I. Geopolitik is shown to evolve within the format of nationalism and through the misapplication of organic analogy to a political state. Major figures addressed in this paper include Freidrich Ratzel, Rudolf Kjellèn and Carl Haushofer. A short historical overview of Germany parralleling the time periods of these figures provides insight into the popularity of Geopolitik in Germany and the influence of Geopolitik on German political and foriegn policy from 1850 tol945.

8:45 INTERRELATION OF EXTERNAL AND INTERNAL MARKET SYSTEMS IN DEVELOPING COUNTRIES Jeffrey J. Gordon, Department of Geography, Bowling Green State University, Bowling Green, Ohio 43403.

The periodic market system in developing countries is organized and integrated into a hierarchical structure. The periodic market place as a physical locus of exchange activity is the basic unit of the overall internal marketing system at work in peasant societies. On a higher level, the individual markets are interrelated, integrated into groups called cycles or networks. These market groups are seen, on the highest level, as integrated into an overall market system which includes at least the regional if not national flow of goods between the urban centers and the countrysides. Taken together, these levels interrelate to form a complex internal marketing system, and at the upper levels is connected to a nation's external market system.

9:00 RIVERS OF WESTERN SIBERIA: CHARACTERISTICS AND POTENTIALS. Jordan A. Hodgkins and Clyde I. Smith, Department of Geography, Kent State University, Kent, OH 44242.

Recent development of oil and gas fields in the West Siberian Basin, and their significance to the national economy have attracted attention to this vast undeveloped wilderness region. Traditionally noted for its harsh and hazardous environment and sparce population, it now looms as a future area for economic exploitation. Historically, its population has been scattered along its rivers which have served as main arteries of communication. Domination the drainage system of this basin is the Ob River with an area of 2,929,00 square kilometers.

The Ob, its tributaries and other rivers of the basin have a general homogeniety of characteristics. Snow is their major source of nourishment. Spring and summer dominate the seasonal flow by more than 90 per cent on some rivers, conversely,winter flows range from 1 to 12 per cent. Moreover, many rivers are frozen from 160 to 229 days. Thirty-three of the rivers have an average capacity of over 100 thousand killowatts.

INSTITUTIONAL RESPONSE TO ENVIRONMENTAL POLLUTION IN THE USSR
Augustine Idzelis, 17916 Hillgrove Road, Cleveland, Ohio 44119

9:15 Environmental pollution is a growing problem in the Soviet Union. Some Western scholars have concluded that the highly centralized nature of Soviet economic planning and management has given the USSR an advantage in dealing with environmental problems. It can also be argued that centralization itself has become an important dysfunctional element in Soviet attempts to control pollution. A number of specific environmental pollution problems will be analyzed in order to show the efficacy of the Soviet response.

The Development of Color Infrared Film as A Geographic Tool. Gerald L. Jackson 114-C Miami Manor, Miami University, Oxford, Ohio 45056

9:30 Color infrared (CIR) film is a specialized tool designed to resolve detail and differentiate color hue, simplifying photo interpretation. The principles of infrared detection have determined design parameters for CIR image formation.

Since 1942, geographers have applied CIR film to many problems. Biogeographers, industrial geographers, cultural geographers, land capability and resource analysts are but a few of the clients who have greatly benefited from the use of CIR film in air photo analysis.

COAL SLURRY PIPELINES FOR ENERGY TRANSPORTATION Mark R. Stuller, Geography Dept. the University of Akron, Akron, Ohio 44325

9:45 Because coal use is expected to double by the year 2000 the ability of existing transportation modes to carry the increasing volume is in question. The unit-train at present, carries 70% of the coal produced, but serious questions concerning the ability of the railroads to expand their capacity at economical rates have renewed an interest in the coal slurry pipeline as an alternative.

From 1957 to 1963 the Ohio Coal Pipeline operated in eastern Ohio, the first commercial pipeline ever built. As a response to its success the railroads developed the unit-train and the pipeline was forced to close. But with today's increasing fuel costs and a newly deregulated rail industry, slurry pipelines offer an economical alternative. One coal slurry pipeline is currently in operation, supplying a Nevada powerplant, eight others are being planned.

This paper will address the still evolving technology of slurry pipelines and examine one promising area of their application- to the coal export market. Because of port delays up to 45 days in recent years, the U.S. export market for coal is not meeting its potential. After a decade of minimal maintenance and development the challenge is how to meet the rising demand of the international market. The coal slurry pipeline offers an excellent solution. Mono-bouy facilities, like the oil super-tankers use now would enable deep-draft vessels to load with a coal slurry. We need to investigate this option as we seek to expand our export market because it is cheaper, cleaner and quicker.

FACTOR ANALYSIS OF ETHNICITY IN IMMIGRANT RESIDENTIAL RELOCATION BEHAVIOR
Vera K. Pavlakovic and Richard W. Janson
10:00 Geography Department, Kent State University, Kent, Ohio 44242 and The Janson Industries, Canton, Ohio 44706

Factor analysis has been utilized to establish the significance of ethnic dimensions in urban residential relocation processes. A Slovenian-Croatian area in Cleveland, Ohio (the St. Clair neighborhood) is famous as an entry point for immigrants from Yugoslavia; and a group of immigrants still living in the St. Clair neighborhood has been compared with two control groups; - one living elsewhere in the Cleveland area and the other comprised of second generation Slovenians and Croatians.

On an apriori basis, only variables that measure ethnicity and socio-economic attributes have been included in the factor analysis; and relocation behavior has been decomposed into underlying factors to differentiate between the two causes and evaluate the respective significance.

Using the results of the factor analysis to model the changing attributes of Yugoslavian immigrants, a Markovian transition matrix has been powered to the year 2000 to predict the likely relocation effects of these changing immigrant profiles to the St. Clair neighborhood.

F. GEOGRAPHY

COMMEMORATIVE SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 259

J.A. HODGKINS, PRESIDING

THE ROLE OF WOMEN IN OHIO GEOGRAPHY. Mary Ellen Mazey, Department of Geography, Wright State University, Dayton, OH 45435.

10:15 As geography enters the decade of the 1980's, the role of women in the discipline has become a focus of research and interest. Since the field of geography has traditionally been male dominated, this paper will examine the recent trends of male versus female participation in Ohio geography. Data on the number of females at the various institutions of higher education in Ohio will be examined. Additionally, the future role of women in Ohio geography will be discussed. Finally, individual females associated with Ohio geography will be mentioned for their contributions to the field of geography.

RECOLLECTIONS OF OHIO GEOGRAPHY AND GEOGRAPHERS, 1948 - 1973.

10:30 Everett H. Bush, Wittenberg University, Springfield, Ohio 45501

One persons recollections about the people that contributed to the vitality of the Geography Section of the Ohio Academy of Science, some efforts at improving the training of secondary school teachers, and what is needed for the future?

FIFTY YEARS OF RESEARCH BY OHIO GEOGRAPHERS. Allen G. Noble and Vern R. Harnapp. University of Akron, Akron, Ohio 44325.

10:45 This year marks the fiftieth anniversary of the establishment of the geography section of the Ohio Academy of Science. During this half century, the orientation and research activities of Ohio geographers have experienced several significant shifts. This study analyzes the papers presented at Ohio Academy of Science annual meetings, identifies these altering perspectives of the discipline, and relates them to the larger world. It also identifies and discusses the association of various institutions and well-known geographers with the Academy.

F. GEOGRAPHY

FIRST AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 259

VERN G. HARNAPP, PRESIDING

1:30 BUSINESS MEETING

BELIZE: AN ISLAND IN CENTRAL AMERICA. Bob J. Walter. Department of Geography, Ohio University, Athens, Ohio 45701.

2:00 The concept of island suggests a unit of land surrounded by water and isolated from other land bodies. Although most often discussed in physical geography, the concept is useful in political, social, and economic geography as a way of demonstrating the isolation of units of a particular type from like units. Belize, a state on the Central American mainland, provides a case study to test this idea. In many respects, it stands isolated from its adjacent, contiguous mainland neighbors and is much more like the islands of the Caribbean.

2:15 TRANSPORTATION NETWORKS AS DETERMINANTS OF EFFECTIVE NATIONAL TERRITORY---THE CASE OF BOLIVIA. Max L. West, 114 Kings Road, Milford, Ohio 45150. (out of Ohio University, Athens Ohio.)

For the political geographer, the concept of Effective National Territory is accepted, yet underdeveloped. There are many determinants or variables of Effective National Territory, but one of the most important or significant is the transportation network of a state which serves to integrate state territory. In Bolivia, quality transport routes are isolated, localized, and are generally greatly underdeveloped in most of the state. The result has been a failure of the central governing authority to successfully integrate most of the territory east of the highland regions. Specific problems exist as a result of the present pattern.

2:30 SOCIO-SPATIAL MORPHOLOGY CHANGE IN LATIN AMERICAN CITIES. John M. Allensworth. Department of Geography, Kent State University, Kent, OH 44242.

The Latin American city is often conceptualized as having a socio-spatial morphology converse of the North American city, with the traditional elites living in or near the urban core and the poor living in suburban slums. Some scholars have referred to this as the "reverse-Burgess" model. However, the impact of population growth, capital investment and planned urban development have changed the physical and social structure of major Latin American cities. The composite of these influences in Latin America projects a socio-spatial morphology which includes core slums, an elite sector leading away from the core and the poor sharing the periphery with newley developed middle- and upper-income residential neighborhoods. There is also a tendency toward commercial binodality. Thus, there is a need to redefine the conceptual model of Latin American cities.

2:45 TRANSITION OF A GRAND AVENUE FROM A RESIDENTIAL TO A COMMERCIAL STREET, THE PASEO DE MONTEJO, MERIDA, YUCATAN. Rodger K. Menzies. Department of Geography, The University of Akron, Akron, Ohio, 44325.

At the turn of the century, a spacious, residential avenue was constructed in the northern limits of Merida. Today the remaining ornate mansions compete for space along this street with modern commercial buildings. The Paseo de Montejo now strategically located between the old center and the new suburbs, continues the transition to a commercial street, while the practical and aesthetic qualities of the original design insure its populatiry as a promenade and social gathering place for the citizens of Merida.

3:00 SOME EFFECTS OF LAW OF THE SEA CHANGES AND NEW SHIP TECHNOLOGY ON GEOPOLITICAL CONCEPTS IN THE CARIBBEAN. Thomas D. Anderson, Department of Geography, Bowling Green State University, Bowling Green, Ohio, 43403.

The Gulf of Mexico-Caribbean Sea region contains thirty four political entities, over twenty of which are independent. Increased world acceptance of territorial seas of up to twelve miles and of two hundred mile wide economic zones places nearly all of the region's waters under some coastal state jurisdiction. Treated in the paper is this matter as well as the effect on inter-state relations of the need to negotiate over seventy five marine boundaries. Of special concern is the question of free passage through constricted channels. Examined also are the strategic implications of the reduction of the extent of navigable ocean due to the unprecedented depth requirements of deep-draft tankers and modern warships. The influence of these changes on geopolitics is discussed.

3:15 FIELD MEASUREMENT OF SOCIO-ECONOMIC CHANGE IN THE ECUADOREAN SIERRA

Gene N. Franckowiak, Department of Geography and Planning, University of Toledo, Toledo, OH 43606

Indigenous residents of two large farms in northern Ecuador are the focus of this investigation. One group has benefitted from positive efforts of the landowner to improve social and economic conditions. The other group continues to experience more traditional relations with the landowner and must depend on other programs for assistance, whenever these are available. Socio-economic differences between these communities have evolved which cannot be carefully examined with data collected by official agencies. Certain field techniques based on unobtrusive measurement were applied to obtain needed information. The methodology is described and analyses of field data are presented.

F. G E O G R A P H Y

SECOND AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 245

SURINDER M. BHARDWAJ, PRESIDING

1:30 BUSINESS MEETING, DENNEY HALL 259

2:00 A VIEW TOWARDS HONG KONG'S FUTURE--THE LEASE IS UP IN 1997 Stephen S. Chang, Department of Geography, Bowling Green State University, Bowling Green, Ohio 43403

The "New Territories" part of the British Crown Colony of Hong Kong was leased from China in the late 19th century with the lease expiring in 1997. Therefore, the future status of the entire colony is questionable.

There are indications and actions which contribute confidence to some that the lease may be extended with the status quo maintained. These signs include oral reassurances from China, joint economic and infrastructure projects, along with China's continuing investment in and reliance on Hong Kong as a major source of foreign exchange. The Hong Kong Government is also investing in some large infrastructure projects domestically to bolster the thought of continuance.

Without concrete agreements, however, there may be a weakening of confidence, which may have an adverse effect on future investment. Economic decline may likely threaten Hong Kong's well-being and survival.

2:15 NON-TRIBAL SETTLEMENT IN A TRIBAL AREA: A CASE OF THE CHITTAGONG HILL TRACTS, BANGLADESH. Bimal Kanti Paul. Department of Geography, K.S.U., Kent, OH 44242

Chittagong Hill Tracts, the tribal dominated district of Bangladesh, has recently become one of the serious trouble spots of South Asia. The dissatisfaction that cropped up in the minds of the tribal people of the district has turned into armed insurgency. One of the most important reasons of the above dissatisfaction is the increased influx of non-tribal people in the district. Though the non-tribal settlement in the district began in 1860 with the extension of outside government apparatus in the district, the rate of settlement has increased tremendously in the recent years. According to Government estimates, the percentages of non-tribal population increased from 9.1 in 1951 to 35 in 1974. With the help of published sources and materials, the proposed paper will examine and analyse the non-tribal settlement of the district and thus provide a background for the present crisis.

2:30 INVESTIGATION OF RICE CROP SUITABILITY FOR PRODUCTIVITY IN TERMS OF SOIL-GEOMORPHIC CONDITIONS IN BANGLADESH.

Mohdudul Huq: Urban Studies: University of Akron.

An attempt has been made to investigate the major limitations of food production particularly rice. The relationship between rice productivity and physical parameters have investigated in terms of Soil-Geomorphic conditions. Finally, the extent to which land is fully utilized in terms of agro-ecological conditions has also been assessed.

2:45 TOURISM AND ECONOMIC DEVELOPMENT: A CASE STUDY OF NEPAL
Mohan N. Shrestha, Department of Geography, Bowling Green State University
Bowling Green, Ohio 43403.

Centuries of isolation imposed both by the rough physical terrain and the political decisions taken particularly during the British expansion in South Asia kept Nepal in a somewhat economic disadvantage. But it did provide the country an opportunity to preserve an unique cultural heritage and a distinct architectural style that fascinated all foreign visitors. A total of 123,636 tourist visited the country in 1978. The tourist industry is the second largest income source of foreign currency in Nepal, and its impacts on the national economy and economic development is obvious. However, some of the negative impacts of tourism on the physical as well as social environment of the country where no established laws of conservation exists should not be overlooked.

The major objective of this study is to examine the impact of tourism on the total economy and income distribution in Nepal. Certain areas of the country where tourist industry has developed to a large extent the average income of the people has increased, but the gap between the rich and the poor also has increased. Much of income generated from the tourist industry has gone to the rich and privileged class, while the poor has remained poor if not poorer.

DETERMINANTS OF LITERACY AMONG THE TRIBAL COMMUNITIES IN INDIA - A SPATIAL ANALYSIS. Madhusudana Rao. Department of Geography, K.S.U., Kent, OH 44242

3:00

The paper aims at identifying the broad geographic patterning of literacy among the tribal communities in India with a case study of the state of Andhra Pradesh. The tribal groups were accorded special priveleges to avail educational facilities in independent India. Hence, an attempt has been made to analyze the growth of literacy among the tribal population during the decade 1961-1971. The study analyzes the existing status of literacy among the tribal and non-tribal population, to develop a comparative picture. Finally, a conceptual approach is developed to ascertain the nature of ecological/locational, social and economic interactional constraints on their educability.

SPATIAL DISPARITIES IN ACCESS TO HEALTH CARE: AN EXPLORATORY ANALYSIS OF THE SITUATION IN BANGLADESH. Abdullah A. Khan. Dept. of Geography, K.S.U., Kent, OH 44242

3:15

Relative spatial access to health care decreases with increasing distance from the location or concentration of health care resources (personnel and facilities). This paper analyzes the spatial organization of health care resources in Bangladesh and derives measures for describing disparities in the spatial patterns of access to health care. The distribution of health care resources relative to population distribution in urban and rural areas is found to be highly unequal; in general, the urban population has a 10 to 1 advantage over the rural population in terms of access to health care resources. The serious policy implications of this urban-rural disparity, when almost 90 percent of the Bangladeshi population are rural dwellers, are examined. The regional variations in relative access patterns are also analyzed with respect to the hierarchy of settlement centers, and extremely underserved areas, requiring the most urgent attention of the health care planners, are delineated.

G. CHEMISTRY

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 250

JOHN D. REINHEIMER, PRESIDING

ALLENE JEANES AND DEXTRANS
Bojan H. Jennings, Wheaton College, Norton MA 02766

9:00

Dr. Jeanes, internationally recognized for her work on the chemistry of carbohydrates, was the leader in the development of clinical dextran which is used extensively as a life-saving blood volume expander in cases of shock and hemorrhage. The search for expanders had begun in the latter part of the nineteenth century when milk infusions were tried and found wanting. During World War II the Europeans made some inroads on the problem, but a totally satisfactory solution was elusive. After events at Hiroshima, which awakened the world to the reality of atomic warfare, Dr. Jeanes convinced the Department of Agriculture, for whom she worked, that a blood volume expander should be developed in the United States. She played a vital role in the research which led to a suitable material, chosen from a wide range of dextrans produced from cane sugar by over a hundred bacterial strains. Long before our present highly sophisticated analytical instruments were available, she perfected methods of chemical analysis and identified variations in the chemical structure of the different dextrans, thus giving rational direction to the course of the research. Her leadership effected successful co-operation among an impressive number of government agencies, university scientists, and industry.

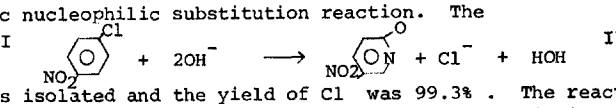
SOME SULFUR HETEROCYCLES, Carl R. Meloy, Urbana College, College Way, Urbana, Ohio 43078

9:15 Sulfur forms a number of stable heterocyclic compounds. When these ring systems show the six π electrons required for aromaticity the resonance energy is very nearly the same as for benzene, and considerably exceeds the resonance energies of furan and pyrrole. From this it might be expected that sulfur heterocycles are fairly easily formed and resist ring opening.

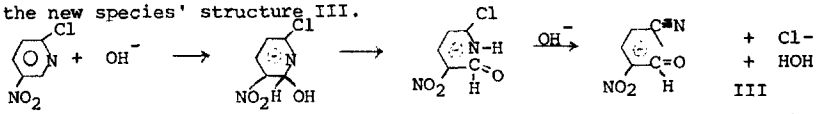
The synthesis and reactions of several sulfur heterocycles is presented in this paper. Among these are tetraphenylthiophene, a tetrasubstituted oxathiole, a series of dithiazole derivatives and cyclic thiocarbonates.

AN A_NRORC REACTION. J. D. Reinheimer, The College of Wooster, Wooster, Ohio 44691.

9:30 The reaction of 2-halo-5-nitropyridines with hydroxide ion was expected to be an aromatic nucleophilic substitution reaction. The



reaction product was isolated and the yield of Cl was 99.3% . The reaction kinetics plot was found to be slightly curved. Observation of the reaction by NMR indicated that a new species, neither starting material or product, was present. NMR, both ^1H and ^{13}C, and IR are consistent with the new species' structure III.



I is stable, but forms III slowly when a third role of base is added. The formation of intermediate, III, is rationalized in terms of the A_NRORC mechanism of equation (2).

METHYL t-BUTYL ETHER: A SUBSTITUTE FOR ETHYL ETHER.
Robert G. Johnson, Department of Chemistry, Xavier University, Cincinnati, Ohio 45207.

9:45 The dangers associated with the use of ethyl ether in the laboratory are well-known. The recent availability of methyl t-butyl ether (MTBE) at a cost comparable to that of ethyl ether, the lower volatility of the former and its lesser tendency to form peroxides suggested a study of MTBE as a laboratory solvent.

The literature concerning the physical and chemical properties of MTBE will be reviewed. Some experiments will be described in which we have substituted MTBE for ethyl ether in the undergraduate organic laboratory and in research work.

UPTAKE AND METABOLISM OF PHENOL BY THE WATER HYACINTH. Shauna R. Brummet and David H. O'Keeffe, Dept. of Chemistry, The University of Akron, Akron, OH 44307.

10:00 The water hyacinth (Eichhornia crassipes), known to take up some organic and metallic pollutants, is being utilized in sewage treatment plants. The chemical of interest to us is phenol, which is on the EPA's list of priority pollutants. The uptake of phenol by single plants, and its effect on them, is being monitored. A plant of 10g dry weight can take up about 1.4 mg phenol/h at an exposure level of 50 ppm phenol (U-^{14}C phenol) in water. Nearly all the phenol is removed in 72 hours. The uptake appears to be exponential at concentrations below 50 ppm and linear at higher levels. At 50 ppm there are almost no deleterious effects on the plant. Exposure to this concentration allows the plant to withstand higher concentrations (up to 400 ppm) with less deleterious effects than experienced with no prior exposure. The most obvious damaging effect of phenol is a marked dehydration of the lowermost leaves. This suggests a malfunction in the transpiration process. Rather than storing phenol, it is metabolized by the plant. After a 1 h. exposure to 100 ppm phenol the plants were acid hydrolyzed, extracted with ether, and analyzed via HPLC on a RP-C18 column with a methanol/water mobile phase. Several constituents, whose identities are forthcoming, were separated. Different constituents were obtained from root versus leaf extracts, with differing ^{14}C activity in the various fractions indicating translocation of some phenol and/or its metabolites. A few constituents showing ^{14}C activity are found to be more polar than the parent ^{14}C-phenol itself. Polyphenol oxidases and peroxidases are presumably involved in phenol metabolism.

10:15 DIELECTRIC RELAXATION OF POLY (BUTYL METHACRYLATE) IN CONCENTRATED SOLUTIONS. Sheanren chuu, Richard J. Ruch and Raymond R. Myers, Department of Chemistry, Kent State University, Kent, Ohio 44242

Measurements of dielectric relaxation have been made on a series of solutions of poly(butyl methacrylate) in toluene. A range of concentrations between 10 and 50% (w/w) was used. The dispersion was studied over the frequency range 20-10^5Hz for temperature between -150°C and +20°C. A single dielectric dispersion was observed for each species which is attributed to the cooperative motion of the main chain and side chain. The complex plot of dielectric constant vs. loss factor could be expressed by the Havriliak-Negami equation. Kauzmann equation was used to calculate free energy, enthalpy and entropy of activation. It has been found that oscillator strength, relaxation time and energy of activation increased with increasing polymer concentration. A significant observation is that the increase with concentration is not linear.

10:30 WHY DOES CBr_4 NOT DISSOLVE IN WATER?

R. Thomas Myers, Department of Chemistry
Kent State University, Kent, OH 44242

The usual explanation goes somewhat as follows. There is difficulty in breaking strong hydrogen bonds, there are weak London dispersion forces between the non-polar molecules, and the major interaction between solute and solvent are weak dipole-induced dipole forces. The first statement is true, the latter two are false. The true situation is different, and more complex.

10:45 "SHE HARDLY CONSIDERED HERSELF AN AUTHOR AT ALL": JANE MARCET AS AN EXAMPLE OF WOMEN IN SCIENCE IN NINETEENTH-CENTURY ENGLAND. M. Christine Anderson, Department of History, The Ohio State University, Columbus, Ohio 43210

Jane Haldimand Marcet (1769-1858) not only exhibited nineteenth-century women's enthusiasm about science, but also stimulated women's interest in obtaining scientific knowledge. Her Conversations on Chemistry(1806), Conversations on Political Economy(1816), Conversations on Natural Philosophy(1819), and Conversations on Vegetable Physiology(1829) "more especially for the female sex" had a wide audience in England and the United States. The content of Marcet's books, especially her famous Conversations on Chemistry, indicates that she had undertaken careful research to ensure the accuracy of her statements and to design simple scientific experiments. Marcet did not emphasize the practical domestic uses of chemistry or any other conventional "feminine" concerns in her books. Her motives and approach to scientific writing provide an intriguing illustration of the dual nature of female involvement in nineteenth-century English science. On one hand, women made contributions to the scientific scholarship of the period and found scientific investigation and writing compelling occupations. On the other hand, Marcet and others like her limited their scientific work to explications of science for popular audiences because conventional standards of appropriate female behavior excluded them from the formal institutions which fostered original scientific investigation.

G. CHEMISTRY

AFTERNOON SESSION, SATURDAY, APRIL 24, 1982

DENNEY HALL ROOM 250

JOHN D. REINHEIMER, PRESIDING

1:30 BUSINESS MEETING

2:00 MULTIFUNCTIONAL CORROSION INHIBITORS F. W. Vahldiek, AFWAL/MLLN, Wright-Patterson Air Force Base, Dayton, OH 45433

Borate-nitrite, piperazine, and piperazine-benzoate based multi-component inhibitor systems have been developed for high strength steels and aluminum alloys. These inhibitors allow for low toxicity and reasonable cost compared to commonly used chromate inhibitors. These new inhibitors have been determined to prevent galvanic

corrosion, accelerated crack growth, and general corrosion. Studies of borate-nitrite inhibitors are under way to determine their overall effectiveness for water rinse and paint applications.

2:15 A NEW METHOD OF PREDICTING THE QUALITY OF COKE BY V^r-$(G)_{R.I.}$ DIAGRAM. Peng Chen and James Y. Tong, Central Coal Research Institute, Beijing, People's Republic of China and Department of Chemistry, Ohio University, Athens, Ohio 45701 U.S.A.

Trend surface analysis has been applied to predict the strength of coke by the V^r-$(G)_{R.I.}$ DIAGRAM, which reflects metamorphism and coking properties of bituminous coal in the laboratory. Coking tests on a semi-industrial scale have been carried out for 134 coal samples (two tons each). The coke strength was determined using the standard procedures set forth in ISO/R 506-1976(E). Functions of different indices were corelated with the measured coke strength. V^r-$(G)_{R.I.}$ gives a better estimate of coke strength than other parameters and the second order equation is distinctly better than the linear equation.

2:30 FORCES BETWEEN MOLECULES IN LIQUIDS.
R. Thomas Myers, Department of Chemistry
Kent State University, Kent, OH 44242

The previous study (J. Phys. Chem. 83 294 (1979)) is extended to polar molecules. Polar molecules do not have added attraction for each other in the liquid phase, due to their polarity, until the dipole moment exceeds some critical value, probably about 2.5 debyes. Below this critical value the forces are entirely London (dispersion) forces. Dimethyl ether boils higher than propane, yet dipropyl ether boils lower than n-heptane. Hexane boils at 69°, 2,4-hexadiyne at 129°. Tentative explanations of these strange facts are presented, including a new look at the derivation of the Madelung constant.

2:45 PARADIGM SHIFTS I: KINETICS OF ESTER HYDROLYSIS. Thomas A. Evans Department of Chemistry, Ebaugh Laboratories, Denison University, Granville, Ohio 43023.

This paper describes an integrated laboratory experiment for advanced undergraduates which reflects current understanding of ester hydrolysis in chemical and biochemical systems. The experiments include (1) numerical analysis of literature data to obtain Hammett-ρ values for several types of esters, (2) spectrophotometric determination of the rate constant for ρ-nitrophenyl acetate hydrolysis, (3) spectrophotometric determination of the role of imidazole in catalyzing hydrolysis of ρ-nitrophenyl acetate, and (4) computer simulation of the imidazole-catalyzed reaction.

Besides offering a useful range of techniques and analytical problems, the project represents an opportunity for students to gain some perspective on the process of science. By exploring the initial contributions of L. P. Hammett to the field of linear free energy relationships and the unwillingness of Nobel Prizewinning C. N. Hinshelwood to embrace those contributions, students see an interesting confirmation of Thomas Kuhn's vision of science as expressed in his book "Structure of Scientific Revolutions".

3:00 ACID RAIN - NATURAL WATERS. Bruce V. Weidner, Miami University, Oxford, Ohio 45056.

Data collected of the pH of natural water from Oxford to Moncton, New Brunswick in last June thru July will be presented. This is the controversial area of the states north and east of Ohio that have been well publicized by the press as the Adirondacks of New York. Some other findings will be addressed.

H. SCIENCE EDUCATION

FIRST MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 316

JOY LINDBECK, PRESIDING

9:00 DEVELOPMENT OF AN INDIVIDUALIZED FITNESS COURSE FOR GRADE VIII STUDENTS Lillian Emmons, Ph.D., R.D. 2925 Broxton Road, Shaker Hts., OH 44120.

A 10-session course has been designed which brings together the topics of growth, body composition, exercise, energy and nutrition under one umbrella, fitness. The focus is on helping individual students gain

greater self-knowledge. This approach is based on the physical, behavioral and cognitive readiness of 13- and 14-year olds. The course is based on the learning theories of Piaget, Bruner, Ausubel and Gagne and employs a variety of methods for presenting the course content. Each session includes a classroom presentation, tables, figures, worksheets and references. The course can be taught easily by educators in health, nutrition or physical education to students or outside community groups. Specially designed worksheets allow students to compare their measurements to those of others of the same age and sex, calculate their energy expenditure for a day, and analyze their diet with a new system of analysis using one unit "measures" to describe the daily requirement for a nutrient and the nutritional value of different foods. Students fill in nutrient bars to see if their diet has enough measures of a nutrient to meet their daily requirement. The unique feature is the individualized approach. The course has been evaluated using cognitive and affective tests.

USING THE KINESTHETIC SENSES TO TEACH METRIC MEASUREMENT

Dr. Evan McFee Bowling Green State University, Bowling Green, Ohio 43403

9:15

Making use of the kinesthetic senses to teach metric measurement provides a method for students to make reasonable judgments about the length, volume and mass of objects in their everyday world. In this presentation examples of hands on activities will be used to demonstrate methods of using the kinesthetic senses to enhance thinking in metrics.

COMPUTER-ASSISTED INSTRUCTION PROGRAMS FOR USE IN GENERAL SCIENCE CLASSES. Edward L. Corley, National Trail High School, RR# 2, New Paris, Ohio 45347.

9:30

The 1979 Needs Assessment Test in Science developed as part of the Ohio Educational Assessment Project was used to identify areas of weakness in the Science knowledge of my 9th Grade General and Life Science classes at National Trail High School.

As part of a greater project involving a comparison of the performance between a control group of students (non-computer using) and an experimental group of students (computer using), programs are being written for the TRS-80 Model III microcomputer in those areas where our students' performance as a group fell below the state average on the 1979 Needs Assessment Test.

This presentation will deal with some of the computer programs that have been written up to the time of the presentation. Participants who would like to have copies of the programs should bring a blank cassette tape of good quality (preferrably Radio Shack computer tape), and they will be allowed to make copies of any program that interests them. If they have any of their own they would be willing to share, they are invited to bring them, recorded on cassettes and ready to be loaded on the computer for duplicating.

Financial support for this project comes through a grant from the Martha Holden Jennings Foundation under a 1981 Grants-to-Teachers grant(C-3-81).

UNIQUE LABORATORY EXPERIMENTS IN CHEMISTRY

Clifford Schrader RD 4 New Philadelphia, Ohio 44663

9:45

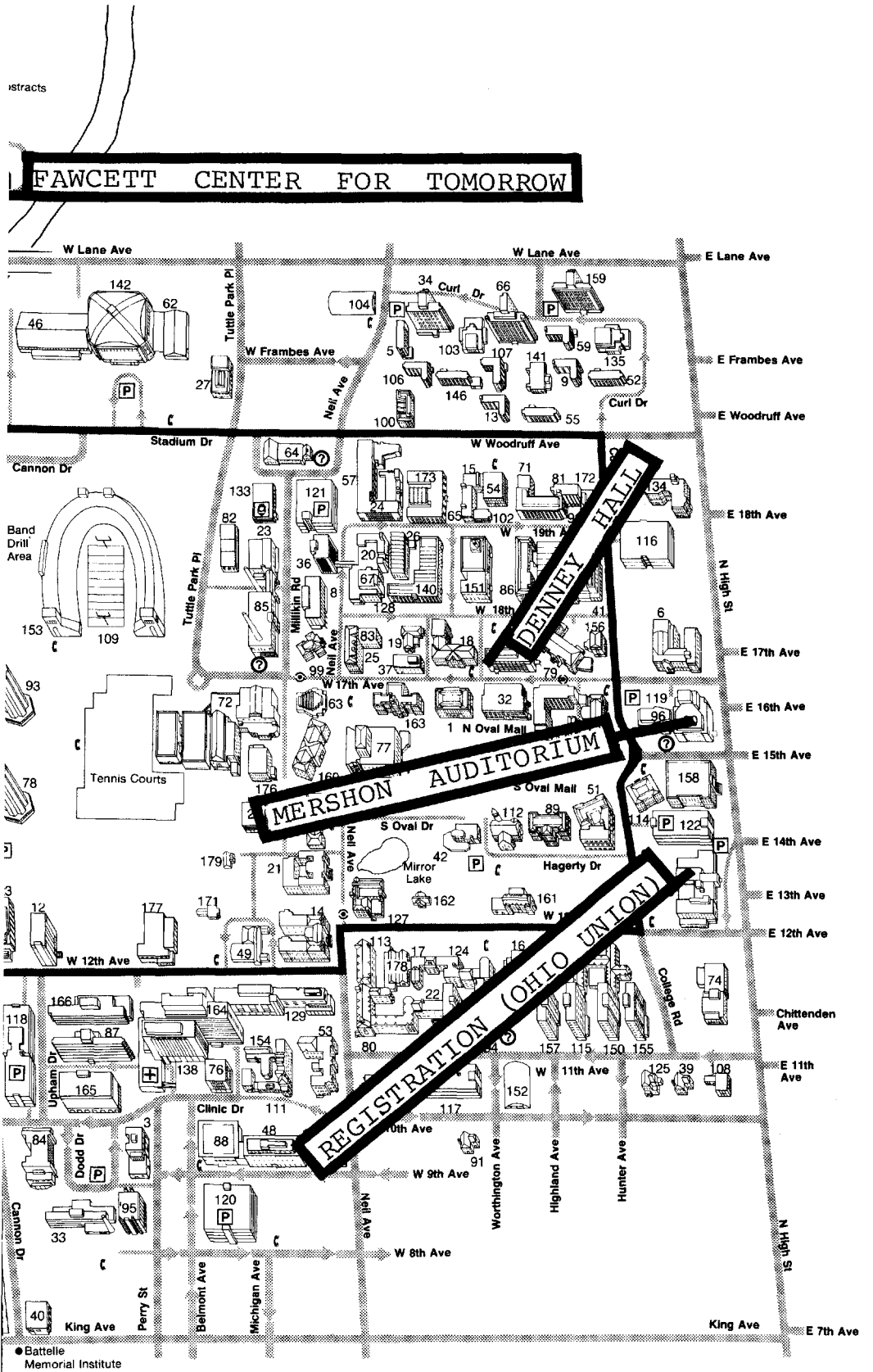
Several laboratory experiments which were devised by Dr. C.L. Schrader will be described and demonstrated. These experiments illustrate laboratory techniques which are particularly useful, and focus on important chemical principles including stoichiometry, the ideal gas laws, and uncertainty in experimental measurements. Data which is illustrative of typical experimental results will be included. These experiments utilize ordinary laboratory equipment.

A COMPARATIVE VIEW OF SCIENCE AND MATHEMATICS HIGH SCHOOLS AND PROGRAMS FOR GIFTED AND TALENTED STUDENTS

Joyce Luhrs, Oberlin College
O.C.M.R. Box #1171, Oberlin, Ohio 44074

10:00

To OSU Golf Course
To Don Scott Field
Olentangy Freeway
Defiance Dr
Buckeye Village
Wirthwein
Tennis Facility
Varsity
Athletic Fields
Trautmann
Baseball Field
Fyffe Rd
Olentangy River Road
W Lane Ave
North Star Rd
Carmack Rd
Kenny Rd
State Route 315
Stadium Dr
Campus
Loop Rd
Coffey Rd
Tennis
Courts
Chessie System R.R.
Kinnear Rd
144
73
132
30
105
11
149
130
2
169
174
131
145
139
10
143
175
4
126
60
50
168
47
148
136
167
45
69
97
38
137
68
70
44
Key
Public Access Road
Limited Access or Service Road
Campus Loop
Key-Card Gate
Visitor Information
Public Parking
Police
Emergency Phones
Hospital Emergency Entrance
North
OSU Columbus Campus



A variety of approaches are currently being utilized to educate students who are gifted and talented in science and mathematics. A comparative study has shown that sociological and psychological factors must be considered when discussing science and mathematics schools and programs for gifted and talented students. In particular, Cuba, the United States, and the Soviet Union have developed such schools and programs based upon cultural and political factors. Several issues which are necessary for a complete understanding of the education of gifted and talented students in these countries include: social class and social mobilization, educational goals, achievements and reforms, the role of the family in the life of the gifted and talented child, and the inclusion of creative thought in scientific research and planning.

10:15 CHALLENGING GIFTED AND TALENTED STUDENTS WITHIN THE CONFINES OF A REGULAR SCIENCE CLASSROOM. Toni L. Miller. 721 Northwood Dr., Uniontown, Ohio 44685.

In the absence of an overall school gifted and talented program, a series of activities and requirements can be woven into the fabric of the regular classroom curriculum in order to challenge gifted and talented students to gain further knowledge and skills in science.

Those students who are earning an "A" average are required to do an extra assigment. This assignment can be a report, a project, a presentation to the class, or an ongoing science fair project. In addition to an extra required assigment, the teacher issues periodic "challenges" which allow the student to creatively solve a problem presented to the class. These challenges can be anything from a demonstration which they must explain to a construction problem which they must solve.

Periodically, gifted students can be taken out of regular class work to do additional, more challenging activities such as tutoring, bulletin boards, administering tests, etc.

By insisting on additional output from gifted and talented students, they will gain more overall knowledge, in depth knowledge and skills; they might not have done so in a regular science classroom without these challenges.

10:30 DEVELOPMENT AND EVALUATION OF AN ENERGY EDUCATION ACTIVITY. Bonnie D. Reilly, Division of Environmental Education, Ohio State University, 2021 Coffey Rd., Columbus, OH 43210.

This undergraduate honors research project resulted in the design of an interdisciplinary investigation for middle school math classes entitled "Energy and Water: The Everyday Connections." The purpose of the investigation was to introduce students to the relationships between water and energy usage and ways to conserve them, and to demonstrate the dependence of electrical energy production on a supply of water. Two activities were developed. The first was a board game dealing with water and energy usage and conservation. The second was a mapping exercise showing placement of power generating stations near sources of water. The investigation was pilot tested with analysis of pre- and post-test responses giving a positive indication that objectives were met for most students.

10:45 THE RELATIONSHIP OF SCIENTIFIC LITERACY AND FIELD DEPENDENCE-INDEPENDENCE AMONG SECONDARY SCIENCE STUDENTS. Wallace W. Black, 2270 Blue Valley Road, Lancaster, Ohio 43130.

Gabel's (1976) Scientific Literacy Q-Sort (SLQ), to assess the perceived dimensions of scientific literacy of groups of individuals, and Donlon's (1977) Figure Location Test (FLT) to determine the degree of field dependence - independence of individuals, were given to 148 seventh grade life science students. Semantic differentials were administered to measure students' attitudes toward each instrument. The purposes of this study were to 1) infer dimensions of scientific literacy for both the field dependent (FD) and field independent (FI) groups of students; 2) compare the strength of agreement of the inferred dimensions between the two groups; and, 3) determine the useability of the FLT and the SLQ with junior high science students. Factor analysis of the SLQ results yielded four inferred dimensions of scientific literacy, and indicated that Gabel's Theoretical Model of Scientific Literacy is representative of this sample population. T-tests revealed no significant differences between the factor scores of the FD and FI groups for any of the four factors. Semantic differential results indicated that the SLQ and the FLT were useable with this sample population. Studies such as this can help to establish an empirically based theoretical framework for science education, to construct science curricula which help students develop adequate levels of scientific literacy, and to improve teaching and student evaluation practices.

H. SCIENCE EDUCATION

SECOND MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 324

PIYUSH SWAMI, PRESIDING

8:45 A COMPARISON OF THE QUARTERLY INDEX TO CURRENT CONTENTS (QICC/LS) AND THE SCIENCE CITATION INDEX (SCI) AS INDEXES FOR CURRENT CONTENTS/LIFE SCIENCES.

Robert W. Williams, The Ohio State University, 376 W. Tenth Ave., Columbus, Ohio 43210.

A random sample was taken from two issues of the 1980 Quarterly Index to Current Contents/Life Sciences (QICC/LS). Each entry from this sample was searched in the Science Citation Index (SCI) to find in which bimonthly issue it appeared. Based on the results of these searches; SCI proved to be as effective as QICC/LS in terms of coverage, indexing features, and currentness. The study concludes that QICC/LS is unnecessary in libraries already holding SCI.

9:00 VOLUNTEER ASSISTANTS IN FIELD RESEARCH Eleanor Longbrake, 307 North Street, Waterville, OH 43566

Earthwatch is a non-profit organization which supports field research in many branches of natural and social sciences by sponsoring expeditions, procuring volunteers to assist with the work and contribute to the costs, and giving scholarships which make possible the participation of students. A team of volunteers usually works for two to three weeks, but frequently the research is continued by successive teams. The writer of this paper has recently been a volunteer on two projects, one on "Pioneer Teachers in Vermont," in the fields of history and social science, and the other in a Costa Rican rain forest, studying the behavior of termites. Each of those expeditions was led by a recognized woman scientist; and women are well-represented as volunteers in the whole range of expeditions, many of which require back-packing, mountain-climbing, scuba-diving, etc. No special background in the area of study is required of volunteers, but they learn a great deal about research methods, the specific content area, and the geographical area. Besides what is learned, rewards include adventure, new friendships, the satisfaction of being useful in scientific research, and, for those who wish to pursue it, academic credit. For the principal investigator, Earthwatch provides financial support, assistance in arrangements, and volunteer help especially for routine tasks and chores requiring extra hands. Prospective volunteers as well as scientists with their own field research proposals can get information by writing to Earthwatch, 10 Juniper Rd., Box 127, Belmont MA 02178. Membership in Earthwatch is $20 per year and entitles persons to receive information on expeditions regularly.

9:30 BOTANY ON SATURDAYS: UNCONVENTIONAL SCHEDULING CALLS FOR UNCONVENTIONAL TEACHING. Robert S. Platt Jr., Dept. of Botany, Ohio State University, Columbus, OH 43210

There are good reasons these days for scheduling college level courses over the weekend. Obviously it represents an outreach toward potential students that are otherwise occupied during the conventional five days of classes, and it increases the time during which classrooms and laboratory facilities can be utilized. But even though the same credit is usually given for the completion of, for example, Botany 112 taken on Saturdays, as for that on the conventional schedule, the weekend course cannot help but involve several significant differences. It is not unexpected that the weekend students represent a considerably greater range of ages, backgrounds and expectations. This is both an increased challenge as well as an opportunity for the instructor to bring a variety of attitudes into class discussions. Such diversity makes it necessary to amplify those activities which will serve to strengthen the feeling of community within the class. A more defined idiosyncrasy of the weekend course is its rhythym: relatively long (3 or 4 hour) periods of contact, separated by six days during which the students are deeply involved in occupations that have little to do with their academic studies. Thus a weekend instructor must not be simply the administrator of that which is necessary to obtain a degree, but like a Sunday preacher, he is an evangelist competing for the continued attention of students who on Saturdays are recovering from six days of diverse primary career activities. It is proposed that this problem be met by introducing as many assignments as possible that are strict in their demand for daily attention, in the students' homes and at work.

CONTEMPORARY ISSUES IN SCIENCE or CONTRACT LEARNING TO REPLACE ADVANCED FORMAL COURSES FOR THE NON-SCIENCE MAJOR. Anne K. Sherwood and F. W. Cropp, Department of Geology, The College of Wooster, Wooster, Ohio 44691

9:45

Many colleges and universities have special course options which permit establishing independent study or tutorial courses. At Wooster a tutorial in Geology was established to enable a senior student to learn "how geology finds its way into the heart and mind of an English major" by reading recent books in Regional Geology, Plate Tectonics, and Paleontology, Paleoanthropology, and Human Evolution. A contract was written to design a course "to blend her strengths in English with her interests in Geology." The student agreed to read the following books: Basin and Range by John McPhee, Rediscovery of the Earth by Lloyd Motz (ed.), Lucy by Don Johanson and Maitland Edey, Origins by Richard Leakey and Roger Lewin, and Ever Since Darwin and Panda's Thumb by Stephen Jay Gould. Like any good contract a clause allowing the "subject to change with the joint approval" of student and faculty member was included; thus when Language of the Earth, edited by F.H.T. Rhodes and R.O. Stone, was published, it became a part of the contract.

An extensive journal and weekly meetings to discuss the readings and the journal were part of the contract. The terms of the contract were met effectively through evaluation of the "quality of the journal and discussions that reflect the quantity of material read and ideas inspired by the books and discussions." Books and articles read since the course ended are proof of "continuing education" enhanced by this contract-learning course.

INFLUENCE OF A MENTOR ON THE DEVELOPMENT OF SCIENTISTS. Beverly A. Rawles, Battelle Project Management Division, 505 King Avenue, Columbus, Ohio 43201.

10:00

A national survey of 570 scientists in the disciplines of biology, physics, anthropology, and psychology revealed that approximately two-thirds had had mentors. Participants completed the Personal Orientation Inventory, an instrument which measures level of self-actualization or psychological well-being. The major findings of the study are: individuals who had mentors are more self-actualized, and are more likely to serve as mentors to others than those who are not. Female scientists are more self-actualized than males, and scientists between the ages of 40 - 49 reached higher levels of self-actualization than any other age group.

An on-going experiment attempting to institutionalize mentoring in a scientific research environment indicates that positive benefits accrue to both the protege and the mentor. The protege receives career counseling and enjoys more challenging assignments. The mentor finds the experience stimulating and enjoyable.

"WOMEN IN ENGINEERING" THE NEED AND THE RESULT OF SPECIAL RECRUITING. Marianne Mueller, 122 Hitchcock Hall, 2070 Neil Avenue, Columbus, OH 43210.

10:15

Women have pursued scientific professions in the past though their representation was mainly limited to teaching. Engineering was always considered a profession for "males only." As of today only 3% of the practicing engineers are women, also the number of female engineering students is increasing steadily.

Several Universities in the last few years have instituted special programs to inform and encourage women high school students about engineering. The Office of Women in Engineering at The Ohio State University was established five years ago though its full scale work wasn't started until the Fall of 1979.

Through various ways of recruiting and a strong retention program the freshmen women engineering enrollment has doubled in two years and the overall College enrollment has increased to 84%.

The recruiting is aimed not only to the students but also to the Career Guidance Counselors who generally lack the knowledge about the engineering profession. Women engineering students participate in many of these activities which not only helps to increase the enrollment but also strengthens their commitment to the profession.

USING VIDEOTAPE VIGNETTES TO TRAIN SCIENCE TEACHERS. Thaddeus W. Fowler and Piyush Swami, Teachers College, #2, University of Cincinnati, Cincinnati, OH 45221

10:30

Videotapes of exemplar science teachers and science instruction are being produced and used to illustrate specific instructional skills and techniques. Pre-service and in-service teachers find the videotapes to be very valuable as models as they work to perfect a variety of instructional approaches. The videotapes have been made using relatively inexpensive color equipment which suggests that others across the state might collect and share additional tapes.

10:45 "Women are Scientists, Too! - A Workshop for High School Women Interested in Science": How To Plan Similar Conferences for Young Women Interested in New Career Options. - presented by Deborah Near-Morales; Eleanor W. Helper; Elizabeth A. Gaines AWISCO P.O. Box 02145 Columbus, Ohio 43202

In January, 1981, the Association for Women In Science of Central Ohio and Battelle's Columbus Laboratories co-sponsored a 6 hour workshop for high school women to learn about different careers in the sciences. One hundred and seventy-five young women from 30 schools attended the conference. The entire conference was offered again in May in response to popular demand. Planning the conference was greatly facilitated by the "Expanding Your Horizons in Science and Mathematics Conference" Handbook for Planners. A questionnaire filled out by participants at the end of the conference helped give feedback which can be used to assist future conferences. The response was enthusiastic from both the workshop leaders and the students, whose average rating of the conference was 4.3 out of 5 points.

H. SCIENCE EDUCATION

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 245

1:30 BUSINESS MEETING

I. ANTHROPOLOGY AND SOCIOLOGY

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 309

DAVID M. BASS, PRESIDING

8:30 PRELIMINARY INVESTIGATION OF POPULATION STRUCTURE IN THE ADENA AND GLACIAL KAME BURIAL COMPLEXES. Paul W. Sciulli. Department of Anthropology, The Ohio State University, 200 Lord Hall, 124 West 17th, Columbus, Ohio 43210

The amount and effects of biological variation within and between populations participating in the Archaic/Woodland burial complexes of Ohio are poorly understood. In addition virtually nothing is known of population structure for these groups. To attempt to remedy this situation the present report considers the pattern of a diversity measure (Shannon Information Measure) for the frequencies of 26 non-metric skeletal traits in three Adena and four Glacial Kame populations. Also, biological distances between all populations are computed from the frequencies of the non-metric traits.

The findings show that population structure for the groups considered was such that little subdivision occurred within Adena or Glacial Kame, with the source of most variation within populations and little isolation between populations. Only four of the 26 traits show significant between group (Adena vs. Glacial Kame) frequencies but these four traits affect the biological distances in such a way that the three Adena and four Glacial Kame populations cluster within their respective groups. Thus, while the source of most variation is within individual population the differences between Glacial Kame and Adena are sufficient to discriminate between them.

8:45 PRELIMINARY ANALYSIS OF THE BIOLOGICAL RELATIONSHIPS OF THE KIRIAN-TREGLIA (33AL39) GLACIAL KAME POPULATION. Kim N. Schneider and Paul W. Sciulli. Department of Anthropology, Ohio State University, Columbus, Ohio 43210.

Kirian-Treglia is a Late Archaic Glacial Kame burial site located about 10 kilometers southeast of Lima, Allen County, Ohio. Thus far, excavations at the site have yielded the remains of at least 30 individuals.

Thirteen cranial measures from eleven adults are used in a comparison with three northeastern Ohio Glacial Kame groups (Stratton-Wallace, Muzzey Lake and Clifford Williams), and the Williams Cemetery group.

Penrose size-shape analysis was conducted. All populations examined clustered together for shape, however the Williams Cemetery group is markedly different in size from the Glacial Kame groups and the Kirian Treglia group.

The Kirian Treglia group also appears to fit in a general north-south clinal size distribution with the Glacial Kame groups examined.

BONE REMODELLING IN A SKELETAL SAMPLE OF MACACA FASCICULARIS FROM ANGAUR ISLAND, PALAU, MICRONESIA. Daniel L. Farslow. Department of Anthropology, The Ohio State University, 208 Lord Hall, 124 West 17th, Columbus, Ohio 43210

9:00

Bone remodelling is evident in the skeletons of 45% of the adult long-tailed macaques (M. fascicularis) in the Angaur sample. Changes include the results of healed fractures and wounds, the formation of bone spurs and osteophytes on the shafts of long bones, and osteoarthritic degeneration of pelvis and limb joints. Age scaling by dental wear analysis suggests that simple aging is not the primary cause of joint degeneration. The preponderance of arthritis-like changes in the limb joints as averse to pathologies in the vertebral column may be related to the relatively small body mass and arboreal life-style of these macaques. While trauma and mechanical stress must be considered a major contributory factor to bone remodelling, the high frequency and unusual distribution of pathologies suggest a homogeneous genetic component in this highly inbred, insular population.

APPLICATION OF GROWTH STANDARDS TO THE EARLY GROWTH OF CAPTIVE GORILLAS Anna W. Bellisari and Paul W. Sciulli, OSU Department of Anthropology 124 West 17th Avenue, Columbus OH 43210.

9:15

Previous investigation of weight gain data from thirteen lowland gorillas (Pan gorilla) in four American zoos showed that the equation $\hat{y} = a + b\,t + c \log t$ provides a basis for growth standards in infant gorillas. The investigation also demonstrated an association between illness episodes and weight gain. Using the equation, weight gain data from two infant gorillas born recently in the Columbus Zoo are analyzed in this report. Observed and calculated weights are compared, and implications for monitoring gorilla infant growth and development are discussed,

SOLAR WIND OVER SWEDEN: 1736-1975. John F. Wing, Department of Psychology, Wittenberg University, Springfield, Ohio 45501

9:30

Sweden is ideal for studying solar effects on human activities because it lies near the auroral oval and has one of the longest, most accurate demographic records. Data by Thomas (1941), Hyrrenius (1946), Gille (1949) and Falk (1976) cover ten demographic periods spanning 240 years. Thomas (1941) showed that before 1840 the deviations in marriage, fertility, and birth rates were positively correlated with harvest deviations ($r = .39$ to $.64$, $.05 > p > .001$) while death deviations were negatively correlated up until about 1800 ($r = -.51$ to $-.58$, $.05 > p > .001$); but after 1865 such deviations were tied more directly to the business cycle ($r = .30$ to $.73$, $.05 > p > .001$). This paper shows that both harvest and business cycles followed the solar cycle. Harvest deviations correlated positively with sunspots ($r = .34$ to $.60$, $.05 > p > .001$) for nine of the ten periods, the only exception being the Gleissburg solar minimum when the solar wind was weak (Feynman & Silverman, 1980). Business deviations correlated positively with sunspots for all periods after 1865 ($r = .41$ to $.61$, $.05 > p > .01$). Typically, at sunspot minima, crops and/or business failed, cost of living rose and social unrest developed, culminating just before sunspot maximum in increased theft ($r = .29$, $p < .10$), drunkenness ($r = .48$, $p < .02$), labor disputes ($r = .63$, $p < .001$), and, most importantly, emigration ($r = .40$, $p < .01$). Since other Scandinavian emigrations correlated positively with Swedish emigration ($r = .41$ to $.79$, $.01 > p > .001$), they also correlated positively with sunspots ($r = .39$ to $.83$, $.01 > p > .001$), thus showing broader effects.

CONTRIBUTIONS OF FRANK G. SPECK (1881-1950) TO ETHNOBIOLOGY. Ralph W. Dexter, Department of Biological Sciences, Kent State University, Kent Ohio 44242.

9:45

Frank G. Speck, a naturalist-ethnographer, was a specialist on the Eastern Indians of North America. A total of 48 studies (about 1/5 of his publications, including three books) were devoted to ethnobiology exclusively or as a primary concern. Many other papers included such information incidentally. Major studies involved the Beothuk and Micmac of Eastern Canada, the Naskapi of Labrador, and the Penobscot of Maine.

Material culture, resource utilization and preservation, methods of hunting, trapping, fishing, etc., family hunting territories, food, medicinal uses, and animal folklore were studied among such Indian groups as the Algonkian, Huron, Six Nations, Wampanoag, Delaware, Rappahannok, Catawba, Houma, etc. The Eskimo of Southern Labrador were also included. His major contribution was the detailed study of family hunting territories and their ecological importance in the economy of these native peoples. Originally he believed such a system was pre-Columbian, but later was convinced that the practice probably developed after contact with Europeans and their demands for the fur trade coupled with game cycles and periodic game scarcity.

HEREDITY VS. ENVIROMENT IN TWIN STUDIES, Eric Beetle Bailey
7E. Walnut St.
Oxford, Ohio 45056

10:00

Attempts to find answers on the importance of heredity and environment can be found in twin studies. Twin studies can offer evidence as to which characters are inherited and which are not, and illustrate that certain characters depend upon environmental factors. The purpose of such study is to determine the relative importance of these two factors in determining our development.

What this paper will discuss are the factors related to twinning. I will attempt to weigh the evidence offered for the relationship of heredity and environment to the causation of twinning. However I will focus on the environmental side of the debate to see if it has any validity.

My conclusion was that there is simply no hard-and-fast distinction between hereditary and environmental traits; all characteristics actually involve both. Very clearly, twin studies show that an examination of twinning frequency must likewise proceed on the assumption that both heredity and environment are responsible for increased occurrence of twin births. However, as illustrated in this paper, such factors as age, geographical location, fertility drugs, diet, and even racial background can indeed change the frquency of twinning. This is not merely speculation but fact.

HOME HELP SERVICES: OLDER PEOPLE'S NEED FOR AND COST OF HOME SERVICES
William Laurie, U.S. General Accounting Office, Room 2933
1240 E. 9th Street, Cleveland, Ohio 44199

10:15

To more specifically identify the kind and nature of home help needed by the older population, we analyzed data collected on the conditions, problems, and helps of a random sample from the over 80,000 older people in Cleveland, Ohio in 1975 and 1976. Our analysis was performed at the request of the White House Conference on Aging.

Considering the need for help in performing activities of daily living, nearly one in every three older needed help with more than one daily task or 18,100 people. Each older person received an average of $429 of home help in 1976. Families and friends provided more than four-fifths of the help ($349) with agencies providing the other fifth ($80).

Not all people received help in activities of daily living. To expand the different kinds of help to meet all the needs of people in Cleveland would cost about $26 million. If this was done, an additional 10,900 older people would have all their needs met.

NURSING HOME EMPLOYEES AND THEIR PERCEPTION OF THEIR PUBLIC IMAGE.
Barbara Zsembik. Department of Sociology. University of Akron. Akron, Ohio,44325.

10:30

As the proportion of elderly people in the American population increases, so do the number of health care institutions designed to meet their specific needs. Research has focused on the negative images the American public has of their elderly and the nursing homes in which a minority of the elderly reside. Research often overlooks the perceptions of nursing home employees with regard to these negative images. This paper explores thepublic image of Registered Nurses, Licensed Practical Nurses, and Nurses Assistants of two nursing homes as they perceive it to be. These perceptions are then examined with respect to the employees' attitudes about their occupation.

A MULTIVARIATE ANALYSIS OF HOMINOID ODONTOMETRICS. IMPLICATIONS FOR PRIMATE SYSTEMATICS. Michael C. Mahaney and Paul W. Sciulli. Department of Anthropology, The Ohio State University, Columbus, Ohio 43210.

10:45

Traditional classificatory schemes for the order Primates recognize three families within the superfamily Hominoidea: Hominidae, Hylobatidae, and Pongidae. Cluster and principal coordinates analyses are performed on odontometrics obtained from the literature for taxa traditionally assigned to the Hominidae and Pongidae. Analyses of raw and allometrically transformed variates for both deciduous and succedaneous dentitions yield clusters inconsistent with this familial dichotomy. The affinities identified in these analyses are indicative of confamilial genera, suggesting that taxa traditionally referred to as hominid and pongid be reclassified as subfamilies (Homininae and Ponginae) within Hominidae. Such an arrangement is consistent with recent biochemical, cytogenetic, and molecular taxonomies produced by other researchers.

I. ANTHROPOLOGY AND SOCIOLOGY

FIRST AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 309

DAVID M. BASS, PRESIDING

1:30 BUSINESS MEETING

DELINQUENCY THEORY: IN DEFENSE OF LABELING - Linda Mooney
Sociology Department, University of Akron, Akron, Ohio 44325

1:45 Within the field of deviance in general and juvenile delinquency in specific, a number of competing explanatory frameworks exist. It is suggested in the present paper that all but one of these perspectives reflect the reigning paradigm in sociology i.e., structural functionalism. The major "traditional theories" of juvenile delinquency are examined and contrasted with the societal-reaction school of thought. Finally, criticisms of labeling theory are discussed and possible defenses and theoretical reconciliations suggested.

IMAGES OF MENOPAUSE. David Perusek, 255 W. Oak St., Kent, OH 44240.

2:00 Menopause has been accorded deviant status in present day America. This paper examines medical textbooks, marketing campaigns and cross cultural studies and concludes that menopause is deviant because we have made it so.

An examination of the textbook treatment of menopause reveals strong undercurrents of cultural bias against the changes heralded by menopause, with emphasis placed upon loss of beauty and sexual attractiveness rather than on any innate qualities of the transition itself. Menopause is commonly referred to as a period of ovarian failure; the implication being that once the ovaries fail, the whole woman cannot be far behind.

Taking the position that transitions derive meaning from the points with which they connect us, this paper suggests that there is nothing inherently deviant in the transition of menopause. Youth and age, however, are glorified and abhorred respectively in our culture, and, since youth and age are the points with which menopause connect us, this paper argues that our attitudes toward youth, age and aging are responsible for the deviantization of menopause.

Marketing campaigns for age "controlling creams", "fade creams" and similar products are reviewed and contrasted with cross cultural examples of menopause as a positive and looked forward to time.

Citing United States Census Bureau projections that the median age in the United States will be 37, by the year 2,000, the paper ends on a positive note, postulating that with the greying of the Pepsi Generation, menopause may again be accorded normal status.

SEX ROLES: WOMEN AND THE DRAFT. Steven Alspach and Barbara Zsembik. Department of Sociology. University of Akron. Akron,Ohio, 44325.

2:15 This study was comprised of 870 college student's responses to a questionaire including an ad hoc list of adjectives, a series of women's role items and a series of draft items. We examined these items with respect to age,sex, traditional and non-traditional attitudes regarding sex roles and their relationship with attitudes about the draft: especially women and the various dimensions of the draft. Our findings are consistent with the general public opinion as noted in asundry periodicals. The implications of our study extend to sex role attitudes and gendere**o**typed roles in the Armed Forces. Conclusions are relevant to attitudes of students at the University of Akron, and possibly relevant to college students in the Midwest.

PRELIMINARY REPORT ON THE USE OF PROVERBS IN A CONTEMPORARY POLISH FARMING VILLAGE. Mark E. Wenden, Ph.D. Candidate, Ohio State University Department of Anthropology, 208 Lord Hall, 124 W. 17th Ave., Columbus, OH 43210 ((614) 422-4149)

2:30 Between October, 1979, and September, 1980, approximately four hundred different proverbs were collected in a farming village in eastern Poland. The proverbs collected were found to have three major forms: proverbial apothegms or platitudes,

proverbial metaphors,and weather proverbs. Rhyming and distinctive meter were common, but not predominant. Content of the proverbs included sanction of appropriate or inappropriate behavior, epigrammatic characterizations, truisms, and in the case of weather proverbs, an agricultural timetable based in large part on Roman Catholic saints' days.

Types of proverbs collected in written form were not represented in similar proportion in everyday speech. This, as well as the fact that in the written sample there appears a small body of proverbs that recur at high frequency, suggests that rapid cultue change associated with the mechanization of agriculture and the omnipresence of mass communications media are causing many proverbs to fall into disuse. This suggestion is supported by other ethnographic data.

EDUCATION MAJORS' ATTITUDES TOWARD BLACK ENGLISH: A CULUTRAL PLURALIST PERSPECTIVE

2:45 Barbara A. Klein University of Akron,Akron, Ohio 44325

A controversy has arisen over the use of Black English in the classroom. Some educators believe that Black English can be used as a tool to teach Standard English. Others believe that Black English is a substandard form to be eradicated. Still others believe that any attempt to teach these students Standard English is an exercise in white supremacy.

The purpose of this paper is to examine the attitudes of beginning education majors toward Black English. It evaluates the attitudes of these students toward cultural pluralism as a general concept, then examines their attitudes on the specific issue of Black English. These results are further dichotomized on the basis of race and income.

BARRIERS TO MODERNIZATIONS AND DEVELOPMENTS IN THE THIRD WORLD COUNTRIES. M. NANAZI 264 OLIN HALL, DEPARTMENT OF SOCIOLOGY. UNIVERSITY OF AKRON. AKRON OHIO 44325

3:00 Modernization is a multi-faceted process. It is not merely an economic process with maximization of potential powers and amelioration of apparatus to dilate the productivity and thereby increase the standards of living in a given society. Other influential elements such as social, cultural, and educational factors also played significant roles in modernization and development of many underdeveloped and developing countries. Almost all of these doctrines share a common sentiment about the modernization with distinct philosophical connotations, and diverse remedies for accelerating the degree of modernization. At the same time, in many developing nations, politics and religion have created an unbearable obstacle to modernization. As Learner (1958) has stated, the people in many Middle Eastern nations today are unified not by their common solutions but by their common problems: how to modernize traditional life styles that are no longer effective. Many seek salvations in past pieties, many follow charismatic and fanatical leaders with precarious ideologies, and many simply remain at distance from the rest of the world to maintain their independence.

THE WORKING WORLD OF THE LONG DISTANCE BUS DRIVER

Dorothy Motley, Department of Sociology, The University of Akron, Akron, Ohio 44325

3:15

While some attention has been focused on the metropolitan bus driver few attempts have been made to study the long distance bus drivers. The present study investigates the sources of job strain among long distance bus drivers. The type of strains that are considered are family and relational strains, health problems, and relationships with passengers and other drivers. A sample of twenty bus drivers have been interviewed to determine the extent and causes of these problems.

THE MEDICALIZATION OF ALCOHOLISM.

Silvia Henriss Department of Sociology, The University of Akron, Akron, Ohio 44325

3:30 The medical model is the current application in use for studying and treating the condition of alcoholism. This paper examines alcoholism and its' definition as an illness by the medical community. Addressing the historical background of alcoholism and its' relationship with the medical model, will provide insight to the illness or disease concept and will clarify the role of the medical community in the treatment of the alcoholic. This paper will also examine the future role of medicine and society in the treatment of alcoholism.

3:45 SOCIO-PSYCHOLOGICAL VARIABLES AND ALCOHOLISM. Naoko Oyabu, Department of Sociology, University of Akron, and Linda Martin, Edwin Shaw Hospital, Akron, Ohio.

This paper reports on a study of certain sociological and psychological factors which may be associated with alcoholism. It also reports on the relationship between these variables and the degree of improvement experienced by patients in an alcoholism rehabilitation program. The concept of "success" of treatment is discussed as it applies to the treatment of alcoholism and the problems involved in measuring success are explored.

4:00 CROWD CHARACTERISTICS AND DRINKING PATTERNS
Tom Bajnok and Gust Pantelas
Kent Trailer Park
Lot B4, S.R. 59
Kent, Ohio 44240

The purpose of this research is to investigate relationships between characteristics of the crowd and drinking patterns in college age bars. It was hypothesized that as a critical density within the bar was reached that the number of drinks sold per person increased. It was also hypothesized that crowd behavior and sex ratio would affect drinking patterns. Systematic observations involving time sampling were conducted in several bars in a college community. As numbers of patrons increased toward a critical density, consumption of drinks per person increased. Consumption is also related to the sex ratio of patrons. Participant observation revealed that small group behavior begins to merge into crowd behavior to change patterns of consumption.

4:15 MEANING OF SUNSET IN THE ERA OF FEDERAL CUTBACK. M. Ruhul Amin, Department of Sociology, The University of Akron, Akron, Ohio 44325.

Elimination of dysfunctional programs through program evaluation and sunset legislation has become quite popular among the state governments. 33 state governments have so far adopted and implemented sunset device. Records of gain from sunset implementation at the state level have been quite considerable at the first round. At the federal level however, the legislative debate over the issue of sunset is yet to be resolved. But cutback on federal programs has been carried out without considering program merits. Thus the retrenchment program of the present federal administration would have been more rational and logical if program review and evaluation proposed by sunset device would have been adopted and implemented.

4:30 A Study of the Antecedants of Social Participation--Frances Geyer Pestello
University of Akron Sociology Dept. Akron, Oh. 44325

Social scientists have long been concerned with the phenomenon of voluntary social participation. Who joins, and why do they join? This paper is concerned with the social origins of voluntary participation. It emphasizes the sequential development of participation behavior through antecedant characteristics of an individual. These antecedants can make one more or less predisposed to social participation. Three interrelated propositions were developed to indicate the relationship between social participation and the three variable categories: structural attributes, formal roles, and workstyle. A study was done on 215 youth workers in a midwestern city. The multiple correlation for the hierarchical model which was developed to show the sequential importance of the three variable categories were weak but significance was found in most of the full regression models. A weak, but significant relationship was found between participation and structure, formal role, and workstyle, using the concepts of centrality and choice in conjunction with one another.

I. ANTHROPOLOGY AND SOCIOLOGY

SECOND AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 312

JONATHAN BOWEN, PRESIDING

1:30 BUSINESS MEETING, DENNEY HALL 309

SYMPOSIUM: SETTLEMENT/SUBSISTENCE SYSTEM ARCHAEOLOGY IN OHIO

2:00 OPENING COMMENTS. MARTHA OTTO, OHIO HISTORICAL SOCIETY

2:15 AN ANALYSIS OF PREHISTORIC LITHIC ARTIFACTS FROM KNOX COUNTY, A PERIPHERAL AREA OF CENTRAL OHIO. Scott James Troy, The Ohio Historical Society, 1982 Velma Avenue, Columbus, Ohio 43211

Current research and analysis by the author of surface collected and excavated lithic artifacts from prehistoric archaeological sites located in Knox County, Ohio, is summerized in terms of goals, methods, theories, and conclusions. A preliminary description and interpretation of the region's lithic material culture is discussed in relation to its implications for understanding local aboriginal adaptation, continuity, and change.

2:30 A COMPARISON OF SITE DISTRIBUTION AND ARTIFACT DENSITY USING DATA PROCURED FROM RESTRICTED LOCALES ALONG THE OHIO AND SCIOTO RIVERS. Shaune M. Skinner, Ohio Historical Society, 1982 Velma Ave., Columbus, Ohio and Dr. David Brose, Dept. of Anthropology, Cleveland Museum of Natural History, University Circle, Wade Oval Cleveland, Ohio 44106.

During the summer of 1981 the Department of Contract Archaeology of the Ohio Historical Society conducted archaeological surveys of two alternate power plant sites on the Scioto and Ohio rivers. The survey methodology in both locales commenced with the utilization intensive and systematic surface reconnaissance techniques. These procedures provided data which is being used to compare the distribution of sites within each project area and the density of cultural debris.

2:45 THE SANDUSKY AND WESTERN BASIN TRADITIONS: A COMPARATIVE ANALYSIS OF SETTLEMENT-SUBSISTENCE SYSTEMS. David M. Stothers, James R. Graves, and Brian G. Redmond. Laboratories of Ethnoarchaeology, The University of Toledo, Toledo, Ohio 43606.

In this paper the settlement-subsistence systems of the Upper Mississippian Sandusky and the Late Woodland Western Basin traditions are compared and contrasted (ca. A.D. 1000-ca. A.D. 1650). This is undertaken through the systematic review of information pertaining to: site size; location; structural configurations (inter-site); systems configurations (intra-site); and ecological-seasonal parameters such as faunal, floral, soils, and topographic orientations. It is suggested that the Late Woodland peoples of the Western Basin Tradition undertook an Iroquois settlement-subsistence pattern while the Upper Mississippian Sandusky Tradition peoples undertook a Mississippian settlement-subsistence pattern.

3:00 TOWARD THE DYNAMIC RECONSTRUCTION OF SANDUSKY TRADITION SETTLEMENT/SUBSISTENCE SYSTEMS IN THE SANDUSKY BAY/HURON RIVER DRAINAGE. Jonathan Bowen, Department of Archaeology, The Ohio Historical Society, 1982 Velma Ave., Columbus, Ohio 43211

The Sandusky Bay/Huron River drainage area of northern Ohio was occupied by perhaps two or three village groups during the period of A.D. 1200-A.D. 1650. While village sites are quite restricted geographically, non-village activity areas are distributed over much of the drainage system. It is hypothesized that horticulture-related constraints limited village location, while resources from other areas were procured by small task forces. A research design for understanding the settlement/subsistence systems of these village groups, and how and why these systems were modified, is also presented.

3:15 ACCULTURATION AND EVOLUTIONARY CHANGE IN HISTORIC SETTLEMENT/SUBSISTANCE PRACTICES IN THE SOUTHERN LAKE ERIE BASIN: THE WYANDOT EXAMPLE. Stanley W. Baker, Ohio Historical Society, 1982 Velma Ave., Columbus, Ohio 43211

In the 1730's and 1740's refugee populations frequented the southern shore of Lake Erie. Although one of these cultural groups, namely the Wyandot, could trace its ancestry to the Huron, the emergent refugees were subsisting in a manner unlike their grandfathers. Contemporary documentation suggests that a bimodal settlement pattern was a result of the post-contact intensification of hunting activities. The Wyandot would remain on the Sandusky River for only 100 years. However, the grandchildren and great-grandchildren of the original immigrants would also show signs of rapid cultural change. In contrast, a new settlement pattern would emerge of independently arranged nuclear family units based on an agrarian subsistance system. It will be shown that this rapid change in settlement/subsistance stratigies as witnessed by the Wyandot was in response to changes in the social, economic, and natural environment in which the Wyandot found themselves. Due to prevailing influences, the Wyandot settlement/subsistance response was quite typical for all native groups in the Northern Ohio region.

4:00 COMMENTS ON PAPERS: WESLEY COWAN, WILLIAM DANCEY AND WILLIAM SUMNER, THE OHIO STATE UNIVERSITY; DAVID STROTHERS, THE UNIVERSITY OF TOLEDO.

J. CONSERVATION

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 308

JOHN R. MARKS, PRESIDING

9:45 THE EFFECT OF RELIGIOUS BACKGROUND ON THE DEVELOPMENT OF MORAL JUDGEMENT AND ENVIRONMENTAL ETHICS IN HIGH SCHOOL SENIORS. Deborah L. Bainer. Division of Environmental Education, The Ohio State University, 2021 Coffey Rd., Columbus, OH 43201.

This study attempted to measure the relationship between the stage of moral judgement and environmental ethics development in selected high school seniors. The study applied Kohlberg's theory of the development of moral judgement through sequential stages to the sphere of environmental ethics. Seniors from six public and private high schools in the Columbus area were given the Defining Issues Test (DIT) to determine their level of development in moral judgement. Use of the Environmental Issues Test (EIT) provided opportunity for measurement of development of moral judgement in an environmental context. A comparison of the importance attributed to principled (Stages 5 and 6) moral statements (the P score) in each instrument evidenced developmental trends related to the philosophy of the educational institution to which the individual was exposed during the transitional period between Stages 2 and 3, and to the individual's religious background and involvement. Application of the methodology used and results of the study should enable educators to identify the Kohlbergian stage of students and to thereby modify instructional materials and methods for maximum efficiency at each level.

10:15 EFFECTS OF A COUSTEAU TELEVISION SPECIAL ON ENVIRONMENTAL KNOWLEDGE AND ATTITUDES. Rosanne Fortner, The Ohio State University, 2021 Coffey Rd., Columbus, OH 43210

Surveys of students in Virginia and Ohio Schools indicated many of the students felt that television was the major source of what they know about aquatic environments. Those who had highest knowledge scores also reported watching the largest number of special programs in the Cousteau television series. Since these studies were mainly descriptive and ex post facto, a project using an experimental design was done to examine the possibility of a cause and effect relationship.

The question considered was what effect does the first episode of a Cousteau television series about the Great Lakes have on the knowledge and attitudes of viewers, and how do audience characteristics relate to knowledge and attitude changes? A pretest-posttest control group design

was used, with testing being done through the interactive mechanisms of Warner QUBE. A sample audience of 250 randomly chosen QUBE subscribers served as the treatment group and another 250 as the control. Analysis of survey answers determined knowledge and attitude relationships and relationship of demographic factors to knowledge and attitudes, as well as how responses of voluntary viewers compared to those of nonviewers and requested viewers.

The results have implications for resource managers, communicators and educators in general in terms of media effectiveness for transmitting environmental information and influencing attitudes among general audiences and audiences with a predisposition toward environmental subjects.

J. CONSERVATION

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 308

JOHN R. MARKS, PRESIDING

1:30 BUSINESS MEETING

2:00 FIELD TRIP (SELF-GUIDING TOUR) OF THE NEW AGRONOMY, NATURAL RESOURCES, AND PLANT PATHOLOGY BUILDING (SEE DESCRIPTION IN FRONT OF PROGRAM)

K. GENETICS AND CELL BIOLOGY

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 253

BONNIE LAMVERMEYER, PRESIDING

FLAVONOID CHEMISTRY AND PLANT PHYLOGENY. Tod F. Stuessy and Daniel J. Crawford. Department of Botany, The Ohio State University, Columbus, Ohio 43210

8:30 Flavonoid compounds have been used successfully for interpreting evolutionary relationships in many groups of angiosperms. These interpretations have often been presented in narrative fashion without specific indications of the kinds of relationships being expressed. Recently, cladistic analysis has provided more explicit means of reconstructing phylogeny. A method of reconstructing phylogeny using flavonoid data is presented. With this method, patristic, cladistic and phenetic relationships are expressed. This approach leads to a phylogram with maximum informational content about flavonoid evolution.

FLAVONOID CHEMISTRY AND PHYLOGENY OF NORTH AMERICA COREOPSIS (COMPOSITAE). Daniel J. Crawford and Tod F. Stuessy. Department of Botany, The Ohio State University, Columbus, Ohio 43210.

8:45 Coreopsis is a genus of the Compositae represented in North America by some 46 species in 11 sections. Previous investigations of flavonoids in the genus have shown the utility of the compounds at various taxonomic levels. A phylogeny of sections based on morphological, chromosomal and hybridization data has been established. Data are presented on anthochlors (flavonoid pigments consisting of chalcones and aurones) from the genus in relationship to the previously proposed phylogeny. Explicit methods are presented for determining cladistic, patristic and phenetic relationships of these taxa employing data from anthochlor compounds.

MURINE AND AVIAN STUDIES OF THE TERATOGENIC AND FETOTOXIC EFFECTS OF ASPIRIN, TETRACYCLINE, HYDROCORTISONE, AND CHROMIUM TRIOXIDE

Bonnie L. Lamvermeyer and Andrea H. Brill, Department of Biology, Denison University, Granville, Ohio 43023

9:00

Commercially available genetically standardized mice were used to assess potential dangers to the developing fetus of maternal exposure to acetylsalicylic acid, tetracycline, and hydrocortisone. Oral ingestion of 75 mg of acetylsalicylic acid per liter of drinking water during days 7 through 17 of gestation resulted in increased fatality rates (36% vs 0% controls) and lower birth weights (1.52g vs 1.84g controls). Subcutaneous injections of tetracycline during any one of the developmental trimesters resulted in decreased birth weights, increased fatality, and marked discoloration of teeth. Maternal hydrocortisone injections additionally resulted in an increase in pancreatic weight among the neonates and a slightly shortened anogenital distance in male offspring. Control males averaged 4.0 and 5.0 mm anogenital distance at 13 and 20 days respectively of postnatal life. Experimental groups showed average distances as follows: offspring of females treated in the first trimester--3.6 mm (at day 20), offspring of second trimester treatment group--3.2 mm (at day 13), and offspring of group experiencing third trimester maternal treatment--3.0 mm (at day 13). The results suggest that hydrocortisone during pregnancy causes demasculization of male progeny.

Chicken eggs injected with 0.05 mg of chromium trioxide on days 1, 2, or 3 of incubation all showed severe malformations with the majority dying early in embryonic development. Malformations included short twisted limbs and necks, exencephaly, and reduction in body size.

KARYOLOGICAL EXAMINATION OF BOVINE FETUSES. N. S. Fechheimer, Department of Dairy Science, The Ohio State University, Columbus, Ohio 43210, U.S.A.

9:15

Live fetuses (n=298) were collected from gravid cows brought to an abbatoir for slaughter. The fetuses ranged in age from less than 50 days to near term. Most of the cows being slaughtered had color markings of Holstein-Friesian (116) or Hereford (109) breeds. Fibroblast cultures were successfully established using skin or lung tissue and karyotypic analysis was completed of 224 samples.

Of 211 fetuses with normal, unambiguous karyotype 52.6 $\pm$ 3.4% were male (60,XY) and 100 (47.4 $\pm$ 3.4%) were female (60,XX). Five fetuses were sex chromosome chimeras containing karyotypes 60,XX/60,XY. No evidence of twinning was seen in any of the uteri from which these fetuses were recovered. One fetus was mosaic for a centric fusion containing cells of two karyotypes, 60,XX/59,XX,t. One fetus, a phenotypic male, had a karyotype 60,X?. It is presumed that the Y chromosome was present but was acrocentric either because it was abnormal or was of the Zebu type. Six of the seven karyologically abnormal fetuses were recovered from black and white cows. All but one of the seven were < 10 cm in crown-rump length; the seventh, a sex chromosome chimera, was 27 cm.

PATTERN BALDNESS: ITS GENETICS REVISITED. Alain Corcos, Department of Natural Science, Michigan State University, East Lansing, Michigan 48824

9:30

Pattern balding has been taught for many years as an example of sex-influenced (or sex-limited) trait that behaves as a dominant in males and recessive in females. A review of the literature and a study of family pedigrees that have been offered reveal that the evidence for such an hypothesis is weak. Genetic studies have been faulty because women have not been adequately included. Women who receive the responsible gene (or genes) are not bald or show only thinning of hair. The dominant-recessive hypothesis seems to have been proposed mainly to explain why the trait is far more prevalent in men than in women. A more likely explanation is that the gene responsible for pattern baldness is an autosomal dominant gene that expresses itself only in the presence of adequate level of androgenic hormone. The question of the nature of the interaction of the gene and male hormone is left open.

THE OHIO PLAN FOR GENETIC SERVICES - A NATIONAL MODEL

Antoinette P. Eaton, M.D., Kathryn K. Peppe, R.N., M.S., James F. Quilty, Jr., M.D., and John H. Ackerman, M.D., M.P.H.
Ohio Department of Health, P.O. Box 118, Columbus, Ohio 43216, and The Ohio State University Department of Pediatrics - Children's Hospital, 700 Children's Drive, Columbus, Ohio 43205

10:00

A regionalized system of health care delivery for genetic services in Ohio was formulated and implemented in 1976. The purpose of this statewide university-based network is principally aimed at the prevention of mental retardation and other developmental disabilities, but with the potential for preventing other genetic disorders having serious consequences. The plan was

designed to consolidate piecemeal efforts and to expand genetic services to the population at risk in the entire state and contiguous boundaries of other states. Key elements include clinical and laboratory services, professional and public education, and uniform data collection to evaluate the program including cost-benefit analysis. A description of the service delivery network, program objectives and a five year analysis of data will be presented to define the impact of this innovative public health system.

10:30 CHARACTERISTIC ACTIVITIES OF CYCLIC GMP PHOSPHODIESTERASE FROM DICTYOSTELIUM DISCOIDEUM. Roman J. Miller and Peter J.M. Van Haastert, Leiden University, Leiden, Netherlands and Department of Biological Sciences, Kent State University, Kent, Ohio 44242.

Cyclic GMP phosphodiesterase, obtained from the cellular slime mold Dictyostelium discoideum, was examined for activity with its substrate, cGMP, and two analogs, cAMP and 8-Br-cGMP. Enzymatic activity was greatly retarded below the threshold substrate cGMP concentration of 0.1 uM. cGMP concentrations above threshold induced a slight positive cooperativity. cAMP was less readily degraded than cGMP throughout the middle range of the substrate concentrations. At the highest concentration, cAMP exhibited slightly increased enzyme activity over cGMP. 8-Br-cGMP stimulated enzyme activity three- to four-fold over cGMP. Similar activities resulted when the enzyme was first primed with 1 uM cGMP before the analogs were added.

K. GENETICS AND CELL BIOLOGY

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 253

ROBERT ESSMAN, PRESIDING

1:30 BUSINESS MEETING

2:00 IN VITRO TESTING OF NATURAL PRODUCT AND ANTI-TUMOR DRUGS USING A DIFFERENTIAL COLONY FORMING ASSAY. Mark T. Wininger and William D. Ross, Monsanto Research Corporation, 1515 Nicholas Road, Dayton, OH 45418.

Currently used chemotherapeutic drugs and candidate drug materials derived from natural products such as plants or microorganisms were tested for activity against proliferating KB human tumor cells. By using a colony forming assay, both outright cell killing and inhibition of cell proliferation to tumor cells was shown. Currently used natural product anti-tumor drugs tested include actinomycin-C, actinomycin-D, adriamycin, cycloheximide, mitromycin-C, vinblastine, and vincristine. Candidate drug materials tested include: bruceantine, catharanthine, indicine, maytansine, a series of maytansine alkaloids, taxol, thalicarpine, and vindoline. Semi-normal human epithelial cells (Detroit D98S) were used to test these same compounds to obtain a therapeutic index of differential cell killing or growth inhibition. Crude mixtures of plant extracts were separated by thin layer chromatography and applied to an agar overlay over KB cells. Zones of "hot spots" of cell killing activity were detected and used to screen for further testing.

2:15 PROPERTIES OF A UNIQUE MLS-RESISTANCE GENE OF CLINICAL ORIGIN IN STREPTOCOCCUS FAECALIS: RESISTANCE EXPRESSION, TRANSFER PROPERTIES, AND PLASMID STATUS OF CS4 AND CS4-UN1. Lou Glatzer and Vijay Sharma, Biology Dept., Univ. of Toledo, Toledo OH 43606

During examination of MLS-resistant chemical isolates of Streptococcus faecalis for conjugal transfer to Staphylococcus aureus (879-R4), one of several strains was found to transfer at rates as high as 10^{-4} per recipient. This strain, named CS-4, appeared to contain at least three plasmids, the largest of which could be found in a S. aureus transconjugant and was estimated at 16-17 Mdal by sucrose density centrifugation. Storage of this strain in the absence of selective agent (erythromycin at 100 μg/ml) led to the apparent curing of the MLS-resistance pattern. However, upon prolonged incubation on erythromycin (Em) challenge plates several subisolates grew on Em at 100 mg/ml. Culture of these strains (CS4-Un1,2,3,etc.) revealed an unusual pattern of growth. The properties of one of these strains (CS4-Un1) can be described as follows: 1) Cells grown in the absence of Em produce two colony sizes upon challenge with Em(100) plates. The small colonies give rise to the "normal" or larger colonies at a rate of 10% of the population. 2) The resistance of the parent and sub-

isolate strains is constitutive and not inducible by 0.5 µg/ml of Em. There is no apparent difference in growth rates of the different colonies in broth culture. 3) Large "normal" isolates [CS4-Unl(L)] can transfer Em^R to other S. faecalis recipients at rates which far exceed the transfer from the CS-4 parental strain. 4) Plasmid analysis of the parental CS-4 strain selected on Em slants reveals only two plasmids of 3 and 6 Mdal. Proposals to explain these phenomena such as chromosomal integration of a conjugal transposon will be discussed.

2:30 CLONING AND EXPRESSION OF ARCHAEBACTERIAL DNA FROM METHANOGENS IN E. COLI. Paul Hamilton and John N. Reeve. Dept. of Microbiology, The Ohio State University, Columbus, Ohio 43210.

DNA isolated from Methanosarcina barkeri and from Methanobrevibacter smithii has been cloned in the cosmid vector pHC 79. Recombinant plasmids were screened for their ability to complement genetic deficiendies in E. coli. Plasmids have been isolated which complement the E. coli argG, purE, and proC mutations. The cloned methanogen derived DNAs have been further characterized by restriction enzyme analyses and Southern blot hybridizations. Recombinant plasmids were introduced into a minicell producing strain of E. coli and were shown to direct the synthesis of polypeptides in minicells.

These results demonstrate that, in spite of the major differences between procaryotic species and Archaebacteria, DNA from the Archaebacterial strains studied can be expressed in E. coli. In view of these observations we would argue that Archaebacteria probably use the same genetic code as procaryotes and that intervening sequences within coding regions are unlikely.

2:45 POPULATION ASPECTS OF NUCLEIC ACID VARIABILITY FOR UNIQUE CODING SEQUENCES OF HIGHER EUKARYOTES
PAUL FUERST, DEPARTMENT OF GENETICS, THE OHIO STATE UNIVERSITY

L. MATHEMATICS AND COMPUTER SCIENCE

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 307

JAMES B. FARISON, PRESIDING

8:30 AN ANALYSIS OF THE READING LEVEL OF GEOMETRY TEXTBOOKS PUBLISHED IN THE UNITED STATES BEFORE 1900. Dr. Joy S. Lindbeck, The University of Akron, Akron, Ohio 44325.

An analysis of the reading level of thirty-three geometry textbooks published in the United States before 1900 was conducted to investigate trends in reading level from 1819 to 1899 and to compare the trend with the reading level of current geometry textbooks. Were geometry textbooks of the last century easier or more difficult to read than those of the present decade in the twentieth century? Is the vocabulary of geometry becoming more difficult or easier for the secondary student?

The geometry textbooks were selected from the collection of early American textbooks of Dr. John A. Nietz which are housed in the Hillman Library of the University of Pittsburgh. Except for the decade of 1820 to 1829, the textbooks which were analyzed represent each decade. Textbooks published in 1978 and 1980 were selected to contrast the vocabulary level of the nineteenth century with that of the present decade. The readability level was established by the Fry Readability Formula. Two explanatory passages and one section of word problems were used in each textbook analysis. The range of the reading levels of the early American geometry textbooks was higher than the range of current textbooks. Students target population and author background appear to be factors in the differences.

RUTH MOUFANG, GEOMETER. Jill C.D.S. Yaqub, Department of Mathematics, The Ohio State University, 231 W. 18th Avenue, Columbus, Ohio 43210.

8:45 Professor Ruth Moufang was for many years at the University of Frankfurt, West Germany. Work that she did during the 1930's has proved to be of fundamental importance to the Foundations of Geometry. It was already well-known that a projective plane can be coordinatized over a commutative field (skew-field) if and only if it is pappian (desarguesian respectively). Her most celebrated result is the following generalization:

Moufang's Theorem. A projective plane can be coordinatized over an alternative field if and only if it satisfies the Little Theorem of Desargues'.

Such planes are now called Moufang, and, by a theorem of R. Baer, are further characterized by the fact that they admit all possible elations, (automorphisms of a specified type). J. Tits has recently proved a very deep analogue of Moufang's Theorem for a much wider class of geometries.

Moufang also investigated the relations between the various special cases of Desargues' Theorem, and studied the structure of alternative fields, namely division rings in which: (i) $x^{-1}(xy) = y = (yx)x^{-1}$ for all $y, x \neq 0$. She showed that alternative fields must satisfy other identities, in particular: (ii) $(xy)(zx) = [x(yz)]x$ for all x,y,z. Loops which satisfy (ii) are now called Moufang loops, and have been studied extensively (by R.H. Bruck and others).

FIXED POINT THEOREMS FOR COMPACT WEIGHTED MAPS OF A POLYHEDRON AND A METRIC ANR. Chandan S. Vora.

9:15 Professor G. Darbo introduced the category $\mathcal{S}$ of T_2-spaces and weighted maps, defined a singular homology theory on this category and extended the Lefschetz fixed point theorem for single valued mappings of a compact ANR to that of weighted maps of a compact ANR in his papers in Rend. Sem. Mat. della Univ. di Padova in 1958-61. In this paper the author extends his result to that of compact weighted maps of a polyhedron (not necessarily finite) and a metric ANR. Moreover, the results proved by S. Masih in his paper in Fund. Math. and his Ph.D. thesis at Indiana University also become a particular case of results for weighted maps in a certain sense.

EXTENSION OF LEFSCHETZ FIXED POINT THEOREM FOR WEIGHTED MAPS OF A COMPACT A-ANR. Chandan S. Vora.

9:30 Professor G. Darbo proved a Lefschetz type fixed point theorem for weighted maps of a compact ANR. Author proved similar type of theorem for symmetric product mappings of a compact A-ANR; and, for certain compact weighted maps of metric ANR's and a manifold. In this paper, author proves the Lefschetz type fixed point theorem for weighted maps of a compact A-ANR. The results for symmetric product mappings become a particular case of this.

COMPUTER SCIENCE CURRICULA FOR SMALL COLLEGES

Z. A. Karian and J. S. Cameron
Mathematical Sciences Department
Denison University
Granville, Ohio 43023

9:45

As small colleges offer degree programs in computer science, they need to determine the central focus of their programs. One common program objective is to provide a technical background for students who are management oriented and are interested in the applications of computing in industrial environments. Most of these students either pursue a double major or supplement their computer science major with a strong background in another field. A more serious objective of many undergraduate computer science programs is the instruction of the discipline of computer science for those students who are interested in the subject matter as a profession. These students are likely to go on to graduate schools or take technical positions in industry upon graduation.

A two-track curriculum satisfying both objectives mentioned above will be discussed with specific course and staffing recommendations.

10:00 SOFTWARE STRUCTURES: THE SECOND AND THIRD COURSES IN COMPUTER SCIENCE

J. S. Cameron and Z. A. Karian
Department of Mathematical Sciences
Denison University
Granville, OH 43023

In the past there has been a great deal written about the contents and structure of the first course in Computer Science. There has been considerably less written about the second course, and very little attention paid to the third course. However, these are the courses which frequently establish the framework for for the remainder of the curriculum. Denison University has developed a one-year sequence (Software Structures) for these two courses which we feel provides a better conceptual background for a student than the second through fifth courses of the reccommended curriculum of The Association for Computing Machinery. This course combines Intermediate Programming with Data Structures. There are several advantages to this approach. First, data structures are developed in a natural manner. Second, larger programs can be assigned which better reinforce the topics covered in class. Finally, when students take later courses much of the background material will already be familiar to them.

10:15 A CENTRAL OHIO CONSORTIUM FOR EDUCATION AND RESEARCH IN COMPUTER SCIENCE. By Lee J. White, Chairman, Department of Computer and Information Science, The Ohio State University, Columbus, Ohio 43210.

A consortium of eight Central Ohio colleges and universities has been formed in order to deal with the critical problem of recruiting faculty and staff in the computer science area. This has become known as the "computer science crisis", and is especially difficult for small private colleges. A number of immediate and innovative steps toward a comprehensive upgrading of undergraduate education have been taken by members of this Consortium, which include:

- training offered by the CIS Department at Ohio State University
- research opportunities provided by the CIS Department
- cooperative development of courses and curricula
- joint development and sharing of special educational resources

Application has been made for external support of this program.

L. MATHEMATICS AND COMPUTER SCIENCS

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 307

JAMES B. FARISON, PRESIDING

1:30 BUSINESS MEETING

1:45 COMPARISON OF CORRELATION AND INVERSION TECHNIQUES FOR TOMOGRAPHIC IMAGE RECONSTRUCTION FROM MULTIPLE-PINHOLE CODED-APERTURE GAMMA-CAMERA DATA. James B. Farison and C. George Daley, Department of Electrical Engineering, The University of Toledo, 43606; A. Dennis Nelson and L. Thomas Andrews, Medical College of Ohio, Toledo, 43614.

The aperture function in optical, X-ray or nuclear imaging systems is a mathematical function which relates the object-to-image transfer to the specific geometry of the imaging system. For multiple-pinhole-aperture imaging systems, correlation of the image data with the aperture function is a commonly-used method of recovering multiple tomographic (planar) images of a three-dimensional object from the two-dimensional camera image.

Linear imaging systems can be described by a linear mathematical model. As a system of linear object-image equations, object tomograms can also be reconstructed by inversion of the system of equations (or pseudo-inversion, as the equations are usually a singular set).

This paper presents a unified matrix model of a multiple-pinhole coded-aperture imaging system, which serves as a basis for comparison of the correlation and inversion image reconstruction techniques. The point source response function, which reflects the ideal aperture function as well as other geometric effects of a nuclear imaging system, is described and illustrated in matrix format. Correlation and inversion techniques are compared, both in mathematical form and for experimental data.

COMPUTER-ASSISTED MUSIC ANALYSIS: WHERE ART MEETS SCIENCE. Ann K. Blombach. School of Music, The Ohio State University, Columbus, OH 43210.

2:00 During the past ten years at The Ohio State University, we have developed a large library of computer-assisted music analysis programs as well as a considerable library of encoded musical data. Some of the simpler programs count notes, intervals, chords, and various kinds of musical patterns, and then compare the results statistically. More sophisticated programs include 16th century counterpoint composition, harmonic analysis, pitch set identification, and twelve-tone row analysis. Yet, despite our success in this field, we must continually work to resolve the conflicts which arise from using a basically scientific tool to study the artistic creations we call music. From the initial difficulty of representing musical notation as a series of symbols the computer can accept as data, to the necessity of interpreting computer-produced results in musically significant scholarly reports, the musical obstacles and music theoretical shortcomings are often much more problematic than other more obviously difficult tasks such as computer programming. The most valuable effect of the computer, then, may well be not the tangible computer-produced results which facilitate useful music analysis studies, but rather, the more intangible significant influence on the quality and rigor of our analytic procedures. Ultimately, the continued application of this scientific tool in music analysis should lead to a much better understanding of the creative art of music.

A BAYESIAN APPROACH TO HYPOTHESIS TESTING. Patricia A. L. O'Neill. Department of Management, University of Dayton, Dayton, Ohio 45419.

2:30 Classical hypothesis testing has been criticized extensively for leading to rejection of the null hypothesis as sample size, n, increases. Bayesians have since 1939 (Jeffreys, Theory of Probability) provided alternate approaches to hypothesis testing using the likelihood ratio. By combining information about the prior distribution of the parameter with information provided by the data, they derive the posterior probability of (or odds for) the null hypothesis vs. the alternate hypothesis. Jeffreys provided a test for no correlation in the population. He suggested that rejectability should occur at values which make his approximation equal to unity. $|r|$'s which yield $K=1$ are solved for and tested by t, the probability of t calculated. This procedure yields critical values, t_k, which correctly should increase with sample size. The corresponding probability could be used as α_k for increasing n. Jeffreys' approximation procedure is compared to Lindley's suggested $\alpha_k \propto (n \ln n)^{-\frac{1}{2}}$ and to Leonard's $(\ln n)^{\frac{1}{2}}$, to be used as a critical value in the case of one parameter. These results accord with Pearson (1953) who suggested that one reduce α as $n \to \infty$, or with the same result, follow Zellner who wished to have the critical value grow with n. Jeffreys and Lindley's suggestions are in agreement, slowly increasing with n. Leonard's increases much more rapidly and appears to be more useful in multiparameter situations. The author suggests application of Lindley's α which agrees closely with Jeffreys' approximation for $K=1$.

IDENTIFICATION OF THE CLASS OF DATA FLOW GRAPHS THAT CAN BE EMBEDDED INTO A DIRECTED PROCESSOR MESH. Hilda M. Standley. University of Toledo, 2801 West Bancroft, Toledo, Ohio 43606.

3:00 The need to increase the speed of computations beyond that which can be offered by developments in hardware technology has resulted in increased interest in asynchronous, data flow computing. Suggestions for "data flow machines" have been for data flow simulators. An architecture which would more closely resemble a data flow graph might better take advantage of the data flow mode of operation and, for a general purpose machine, a directed processor mesh offers a solution.

One of the questions concerning the embedding of data flow graphs is: which graphs can be embedded into this mesh? A theorem is presented which gives a stepping property (the left-most 1 in every row (except the first) appears at no lower column number than the previous row's right-most 1) of the associated adjacency matrix as the necessary and sufficient condition for the existence of an embedding of a data flow graph. The sufficiency of the property is established by a level-by-level embedding scheme based on the identification of levels in the topological sort on the nodes which label the rows (or columns) in the adjacency matrix. The necessity is based on a corollary of the Jordan Curve Theorem and demonstrated by contradiction.

PROTOLOGIC: ASSEMBLY LEVEL LANGUAGE FOR MINDS AND OTHER INTELLIGENT SYSTEMS
Jack E. Steele, M.D., General Bionics Corporation, 2313 Bonnieview Avenue, Dayton, Ohio, 45431.

3:30

For a given function there is an optimum form whether achieved by human technology or by biological evolution. Digital computers are based largely on Boolian algebra, a symbolic formalization (presented by Boole as The Laws of Thought) of Aristotle's formalization of the rules of Greek grammar (a communication language) which he erroneously assumed to be identical with the brain's machine language or the mind's assembly language.

This paper proposes an assembly level language for the mind consistent with, but not based upon, known properties of the hardware. It is presented as if derived from classical logic. The basic elements are constellations, semi-self structured sets of a doubly fuzzy nature, and operations on them. It is largely a content, rather than a formal logic.

There have been three attempts at machine realization: special purpose component design (analog) by General Electric, special purpose digital differential analyzer, design by Teledyne (construction by Melpar), and simulation in MAP and Fortran IV by I.B.M. Service Bureau Corporation.

Protologic is a representational system only. Problem solving requires the addition of a control algorithm guided by a goal-negoal lattice. This exists at present only in generalities and a few ad hoc programs.

A TECHNIQUE FOR THE DESIGN AND IMPLEMENTATION OF AN ADAPTIVE CONTROL SYSTEM

Dr. Adel Ghandakly, Dept. of Elec. Eng., University of Toledo, Toledo, OH 43606

3:45

A technique for the design and implementation of an adaptive control system using an on-line minicomputer in real time is developed. The technique uses a second order linear model to identify the controlled process (linear or nonlinear). The parameters of the model are estimated and updated every sample period to represent the process under all conditions. The identification technique uses a correlation method for parameter estimation. Based on the estimated parameter model, an optimization technique is used also in real time and on-line to determine the optimal control for the process. The optimization technique uses a least square error criterion to solve the optimal control problem. This process is repeated continuously every sample period to keep the system performance close to optimal. The technique has been developed and implemented using an HP 2100 minicomputer. The controlled process is a model generating unit. For this process, the generating unit excitation is controlled with the objective of minimizing the swings in power angle and speed under disturbance situations. Disturbances such as step changes and sudden short circuits are examined. Results are showing that such adaptive control technique presents feasible solution to the problem of optimal control of fast and continuously changing processes. It also presents a feasible sophisticated all digital alternative controller to the classical analogue controllers. This is a desired objective in large systems (such as power systems) where moving towards extended hierarchial computer control is inevitable.

M. PSYCHOLOGY

FIRST MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 338

JAMES E. KANTNER, PRESIDING

MORAL JUDGMENT, NEED FOR UNIQUENESS AND SEX-ROLE TYPE. Lisa Kordowski, James E. Kantner, and William T. Roberts, Department of Psychology, Eastern Illinois University, Charleston, Illinois, 61920.

8:30

The relationship of moral judgment with need for uniqueness and sex role type was explored. The Defining Issues Test, an objective measure of moral development, Need for Uniqueness Scale, and the Personality Research Form ANDRO Scale were administered to 60 undergraduate juniors and seniors. Moral judgment was found to relate with need for uniqueness but not sex role type. The interrelationship of the variables and implications of the study are discussed.

EFFECT OF POST INJECTION ILLUMINATION ON DATA IN PASSIVE DARK AVOIDANCE TRANSFER. P. Jeffrey Conn and Jovanna Riggins, Lee College, Cleveland, TN 37311

8:45 A number of researchers have demonstrated interanimal transfer of passive dark avoidance in rats and mice through brain extracts. None of the studies reviewed make mention of the post injection living conditions of the animals. It is possible for this and other typically unaccounted for variables to have a direct effect upon the results of this type of study. In the present study, Sprague-Dawley rats were trained to avoid the darkened chamber of a three chamber maze through administration of shock upon the rat's entrance into the darkened chamber. Extracts were taken from brains of trained rats and injected I.P. into naive swiss mice. A second group was injected with extract taken from untrained donors. After injection recipients were exposed to either constant darkness or constant illumination. There was no significant difference between animals maintained in darkness and those maintained in illumination in the amount of time spent in the darkened chamber in subsequent testings, neither was there a statistical difference attributable to injection with extract taken from trained vs. untrained donors. Five of the twenty mice injected with extract taken from trained donors did engage in behavior patterns indicative of fear (e.g. running and squealing, urination, defecation, and violent shaking). These behaviors were not observed in recipients of extract taken from untrained donors.

THE EFFECTS OF BILATERAL HIPPOCAMPAL LESIONS ON MATERNAL BEHAVIOR IN SPRAGUE-DAWLEY RATS. Lynda Fink, Helen M. Murphy and Cyrilla H. Wideman. John Carroll University, Cleveland, Ohio 44118.

9:00 Some behavioral studies have indicated that maternal behavior is altered in animals with hippocampal lesions. The present study was undertaken in an attempt to expand and clarify the nature of this alteration. The following parameters were studied: pup survival to weaning, mean body weights of pups born to hippocampal lesioned mothers, nursing behavior, nest building behavior, and retrieval behavior in mothers with hippocampal lesions. Pup survival to weaning (21 days) was significantly lower in animals with hippocampal lesions than in control animals. Mean body weights were significantly lower in pups born of mothers with hippocampal lesions than in controls 5 days after birth. These weight differences disappeared by day 14. Nursing behavior and nest building behavior were significantly poorer in animals with hippocampal lesions. Some differences were also noted in retrieval behavior. Although there were no significant differences in retrieval behavior when the pups received no treatment, poorer retrieval behavior was noted in rats with hippocampal lesions when the pups were covered with vaseline or food powder. Poorer retrieving was also noted in these animals when the pups were contaminated with the scent of another rat. It is suggested that the deficits in maternal behavior are caused by defects in the animal's ability to properly sequence cues. It appeared that the hippocampally lesioned dams were unable to conduct the sequence -- recognition of the pup, picking up of the pup, and returning the pup to the nest.

CRIMINAL BEHAVIOR AND MORAL JUDGMENT: A 3 YEAR FOLLOW-UP OF PRISON RELEASE AND PAROLE ADJUSTMENT. James E. Kantner and William T. Roberts, Department of Psychology, Eastern Illinois University, Charleston, Illinois, 61920.

9:15 Low moral judgment is viewed as an important contributing factor to antisocial behavior. Previous studies have reported significant relationhips of criminal behavior with measure of social cognitive development. In the current study, 147 incarcerated adult offenders were given the Defining Issues Test, an objective measure of moral development. A three year follow-up study was completed to investigate the relationship of moral judgment and committing offense, prison behavior, parole adjustment and recidivism. The study found no relationship between moral judgment, committing offense and prison release. Exit from different prison security levels was related to parole outcome. Problems with using the Defining Issues Test "P" Score in offender populations are discussed.

THE EFFECTS OF COACTION AND SPECTATOR CONDITIONS ON YOUNG CHILDREN'S PERFORMANCE OF SIMPLE AND COMPLEX BALANCE TASKS. Mary Jo Weaver MacCracken, Ph.D., 110C Memorial Hall, The University of Akron, Akron, Ohio 44325

9:30 This field study using both simple and complex motor tasks examined the social facilitation effects of acting "alone," in coaction, and before spectators upon the dynamic balance performance of boys and girls (n = 120), aged 4, 6, and 8 years. Psychomotor achievement of children, calculated to possess high or low balance skill levels according to the pretest, was measured by a modified form of the DeOreo Fundamental Motor Skill Inventory on both product and process variables. Two trials were administered on three simple and three complex tasks. The study was a two (sex: male and female) by three (age: 4, 6, and 8 years) by two (skill levels low and high) by three (audience situations: "alone," coaction, and

spectator) factorial design, with repeated measures on the last factor. Statistical procedures conducted on the test scores were threefold: correlations between and within simple and complex tasks; 2 x 3 x 2 x 3 ANOVA's with repeated measures (situation); and 2 x 3 x 2 MANOVA's. The effect of the presence of others was significantly evidenced in both spectator and coaction conditions over the "alone" state with both 6's and 8's, and in coaction with 4's. In coaction with competition and modeling available, the performance of all three age groups was enhanced regardless of skill level. In spectator the 6's performance was impaired when skill was low but enhanced when skill was high.

LATERALIZATION OF BRAIN IN MEN AND WOMEN. Eugene Galluscio, Donna Whiteside, and Angela Hoopaw. Northwest Missouri State University, Maryville, MO, 64468.

9:45 The localization of function within the brain has generally been studied by integrating the findings obtained from brain-injured patients with the more closely controlled data obtained from laboratory animals. Some authors have argued that both of these methods of study are fraught with problems in methodology and interpretation.

In recent years, new methods have been developed to study hemispheric differences in normal, intact subjects. These studies make use of lateralized input and output techniques, capitalizing on the partially separate pathways in the intact human nervous system. In the most widely used technique, visual information is presented tachistoscopically from the left or right visual field, thus ensuring that it is received by only one half of the brain and therefore can only be processed to the contralateral side via the neocortical commissures. Using this research paradigm, delays in response time or increased errors in responses have been interpreted to mean that the information which has been directed at the "inferior" or "incorrect" hemisphere has been transferred to the hemisphere that is "superior" or "dominant" for the type of information being processed. Using this paradigm, researchers have generally reported left brain superiority for verbal tasks and right brain superiority for spatial tasks in dextral males. This lateralization appears less pronounced in female subjects. The research reported in this paper suggests that both sides of the brain may evidence superiority for the same verbal task simply by controlling for the predictability of stimulus presentations. The results are discussed in terms of sex differences and anticipatory priming of brain hemispheres.

AN EVALUATION OF THE DUKE OLDER AMERICANS RESOURCES AND SERVICES QUESTIONNAIRE: SOME VALIDITY, RELIABILITY, AND PREDICTABILITY CONCERNS. Ronald F. Bobner, Isadore Newman, Doris Combs, Joe Williams, and John Mahaffey. R. Bobner, School
10:15 of Education, Youngstown State University, Youngstown, OH 44555.

The delivery of appropriate services to the elderly population of the United States is becoming an increasingly important issue. Currently, one in nine citizens is 65 or over and by the year 2030 one in five will be in this category. This change in population demographics is occuring at a time of dwindling resources. These facts suggest the necessity for valid and reliable methods of assessing the needs of this population. One of the first attempts to create a comprehensive assessment instrument was the Duke Older Americans Resources and Services (OARS, 1978). The purpose of the current study which utilized 628 institutionalized elderly was threefold: First, to establish some of the psychometric properties of the five scales; Second, to establish reliability estimates for the five summary scores and; Third, to compare the five summary scores to the summary scores created utilizing the General Accounting Office's Well-Being Study methodology (1977).

M. PSYCHOLOGY

SECOND MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL 343

PAUL E. PANEK, PRESIDING

CONTROLLING FOR ECONOMY OF EXPRESSION IN CREATIVITY RESEARCH. John F. Wakefield, Department of Psychology, Eastern Illinois University, Charleston, Illinois, 61920.

8:45

Recent research on the Thematic Apperception Test indicates that subjects who tell long stories in response to the blank card also tend to be creative. They tend to do well not only on tests of divergent thinking but on a non-divergent test of creativity, the Remote Associates Test. One issue which has emerged from this research is whether or not lengthy responses to the blank card also reflect a contaminating factor such as glibness.

Since the RAT is a fill-in-the-blank exercise which has perceptibly correct answers, the number of incorrect answers to the RAT was used as a measure of glibness of response. RAT and TAT data for 47 female college students were analyzed, and the correlation between error scores on the RAT and total wordages of the blank card story was found to be negative and significant at the .05 level (-.33). In a subsequent study, 30 male and female students took the RAT and Wagner's Hand Test. The correlation between the RAT error scores and total wordages in response to the Hand Test blank card was negative and significant at the .05 level (-.36).

Responses to the blank card of the TAT not only appear to be free from glibness, but in general, blank cards among ambiguous stimuli appear to evoke economy of expression--one quality of creative productions. Further research on the RAT error score as an indirect measure of economical expression is needed.

9:00 EVALUATING INSTRUCTIONAL EFFECTIVENESS. This study was designed to assess the ability of a 75-item pretest and a 34-item student end-of-course evaluation instrument to predict students' performances on ten weekly unit quizzes. Three questions were investigated: (1) Are the ten weekly quizzes significantly interrelated? (2) Are pretest scores significantly related to performance on the weekly quizzes? (3) Are students' evaluations of the course related to their performances on the ten weekly quizzes? The ten weekly quizzes were found to be highly interrelated. The pretest was found to be significantly correlated with each of the ten weekly quizzes. Only 58 of 340 correlations between performances on the ten weekly quizzes and the 34-item student course evaluation were significant at the .05 level. The largest percentage of significant correlations were between students' ratings of the course and unit objectives and performance on the weekly quizzes. Students' responses on the four summative course evaluation items were unrelated to quiz performances. Pretest data suggests that the 34-item instrument can be used to predict future performance of students in the course. Thus it has the potential to be a valuable counseling tool. Data from the summative student evaluation item strongly suggests that students' evaluation of the course and instructor are independent of the grades students receive in the course.

Ralph F. Darr, Jr.
Dept. of Educ. Foundations
The University of Akron
Akron, OH 44325

9:15 SELF CONCEPT IN YOUTH AND AGED. R. Deitchman, R. Gandee, W. Swallow, and J. Martin. The University of Akron, Akron, Ohio 44325.

Historically the study of the self concept has focused on adolescents. The current study compares the results of an adolescent population and older adult population. Major issues with both populations has centered on the degree of stability and continuity of the self concept rather than on the criterion used to measure what appears to be an elusive construct. Adolescents and older adults were administered the Rotter internal external scale, Homes and Rahe Stress Scale, and a religiosity scale. The resulting protocols were examined for dispersion as well as content.

An examination of the data showed that:

(A) Low stress on the Holmes and Rahe for both the adolescent and older adult population.
(B) The adolescents not only showed diversity in their response as opposed to the older adult they were consistently higher in self-concept.
(C) The adolescents were consistently higher in internal control than they were in external control. The older adults were higher in external control.

The ability to do a comparison of an adolescent population to an older adult population is shown as tenable. Limitations of the current study as well as the theoretical framework for examing both groups will be discussed.

9:30 ASSESSMENT OF AFFECTIVE CHANGES ASSOCIATED WITH THE "PREMENSTRUAL SYNDROME" USING THE HAND TEST. Patrick Maloney Department of Psychology #14 Hake Hall Northwest Missouri State University Maryville, MO 64468

Forty-eight college women were administered the Hand Test. One group was tested in the premenstrual phase of the menstrual cycle (days 20-25) while the other group was tested at the beginning of the cycle (days 5-9). Significant differences were obtained, but the results did not corroborate earlier research findings which have suggested that negative personality traits are associated with the premenstrual phase of the cycle. Implications of the results and relevant methodological considerations are discussed.

10:00 SOCIAL PSYCHOLOGY OF WOMEN IN SPORTS: REASONS FOR REJECTING THE MERITOCRATIC MALE MODEL AS THE SOLE AMERICAN MODEL OF SPORT. Russell H. Lord. Northwest Missouri State University, Maryville, MO, 64468.

The long-held, but inadequate perspective of masculinity-femininity as bipolar opposites, accompanied as it was by the conceptualization of instrumental behaviors as uniquely masculine and expressive behaviors as uniquely feminine, is rejected in favor of the concept of androgyny, in which the individual amalgamates instrumental and expressive behaviors to produce the "best of both worlds". The implications of this perspective of gender for the increasing participation of females of all ages in various types of sports is then examined. The currently dominant model for American sports is the traditionally male, meritocratic model which bases participation upon an "earned right" and prizes traditionally masculine, instrumental behaviors while simultaneously devaluing traditionally feminine, expressive behaviors. This stands in opposition to the historical orientation of women to sport, an orientation which has not been as instrumental as that of males. Several psychological consequences of the current movement of women's sports away from the more egalitarian, expressive model encouraging mass participation toward a meritocratic model allowing only elitist participation are examined. Among these consequences are the inevitable decline in extrinsic rewards under a meritocratic system, the implications for self-perception, the potential impact upon other, longer-term aspects of an individual's life in light of Spence and Helmreich's work on androgyny and success, and internalizing the ideology underlying the "American Sports Creed".

M. PSYCHOLOGY

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 338

ROBERT GANDEE, PRESIDING

1:30 BUSINESS MEETING

2:00 UTILIZING PSYCHODRAMATIC PROCEDURES IN THE TRAINING OF THERAPISTS. Ronald J. Klein, Ph.D., Western Reserve Psychiatric Center, P.O. Box 305, Northfield, OH. 44067.

Psychodramatic methodology and techniques will be examined, discussed and demonstrated with full audience participation. The primary areas to be addressed are as follows: (1) psychodramatic production techniques that might be best utilized when teaching psychotherapy to therapists, such as doubling, role-reversal, role-playing, mirroring, etc.; and, (2) the benefits to be obtained through psychodramatic training, such as spontaneity, creativity, role-flexibility, empathy, ego-function assessment, etc.

N. JUNIOR ACADEMY

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 313

CARRIE W. RINKER, PRESIDING

8:45 INTRODUCTION OF JUDGES, BRIEF EXPLANATION OF JUDGING AND REVIEW OF THE DAY'S EVENTS

A NEW APPROACH TO THE USE OF LINEAR AND COMPLEMENTARY METAL OXIDE SILICON INTEGRATED CIRCUITS IN HOME SECURITY SYSTEMS -Phillip M. Aspenwall, Box 252, Mt. Pleasant, Ohio 43939

9:00

This paper concerns the development of an electronic security system, capable of detecting and acting upon an unauthorized intrusion into a protected area in a home, store, office, etc. All functions of such a system which can be divided into the three principle subsystems of detection, communication, and action are carried out effectively and very reliably through the use of integrated circuit technology.

More specifically, a combination of linear and complementary metal oxide silicon (CMOS) integrated circuits was used. The testing done on the prototype has shown it to be reliable and economical. The latter being primarily because of the low cost and also the low power consumption of the integrated circuits used.

The Effect of Epinephrine in the Production of 3',5'-adenosine monophosphate in the Different Epithelial Cells in the Bufo marinus Urinary Bladder Presenter: Kenneth Cho 5557 Olde Post Rd. Sylvania, Ohio 43560

9:15

The Bufo marinus urinary bladder is the model system for the human distol nephron. The production of 3',5'-adenosine monophosphate is that it affects sodium transport, a factor in hypertension. The cells in the bladder consist mainly of mitochondria-rich cells, and granular cells. The purpose of the experiment was to find which if any cells reacted to epinephrine in 3',5'-adenosine monphosphate production. The technique used to separate and collect these cells was the gradient centrifugation technique as is described by Scott, Sapirstein, and Yoder (Science, May 17 1974, Vol. 184, pp. 797-800). Four samples were collected from each of the four bands of material obtained by this technique. One sample was used as a control, and the other three were incubated for 20, 40, and 60 minutes in epinephrine. After the incubation, the samples were tested for 3',5'-adenosine monophosphate production using the Radio-Immunon Assay kit put out by New England Nuclear Inc.. It was found that only the sample of mitochondria-rich cells which was incubated in epinephrine for 60 minutes showed a significant increase in 3',5'-adenosine monophosphate. This information may be useful in the study of the effects of epinephrine and other catecholamines on the human distol nephron.

THE EFFECTS OF SODIUM HALIDES ON THE FERMENTATION OF SUGAR

9:30

Michael Chrysochoos
St. John's High School
Toledo, Ohio 43615
5901 Airport Hwy.

The fermentation of table sugar by baker's yeast was studied in the presence and absence of sodium halides (NaCl, NaBr and NaI) by collecting the amount of carbon dioxide formed. The volume of carbon dioxide collected was converted into number of moles using the ideal gas law and appropriate corrections. The amount of carbon dioxide formed was plotted vs time. Both the initial rate and rates at different time intervals were obtained.

The induction period increases with the amount of NaCl. It ranges from 12 to22 hours, respectively. The initial rate increases with increasing NaCl and then decreases. Other rates showed a similar behavior. The effect of NaBr is less drastic than that of NaCl. On the other hand, the presence of NaI appears to increase the rate of fermentation slightly. In all of these experiments the highest yield of fermentation was about 5.9%, achieved in about 100 hours.

All the experiments were carried out using 9.9 grams of sugar and .1 gram of yeast. The amount of sodium halides varied from zero to 4 grams. The amount of sugar, yeast, sodium halide and water was kept constant at 100 grams. The temperature was kept at 21° C and was used in the ideal gas law.

ALPHA PARTICLE INDUCED SOFT ERRORS IN DYNAMIC RANDOM ACCESS MEMORIES. Charles D. Linville, 1846 N. Main St., Urbana, Ohio 43078

9:45

Modern dynamic random access memories (D-RAM's) have been shown to exhibit soft errors due to the passage of alpha particles through the die. The alpha particles are emitted by the radioactive decay of uranium and thorium, which are present in levels up to 50 parts per million in the device package. This paper describes the mechanics of this phenomenon, factors influencing the rate at which these errors occur, and the attempts by the D-RAM makers to reduce the effect of the errors. Also, a description of the author's experimentation showing the relationship between the clock rate and the soft error rate is given.

THE EFFECTS OF AEROSOL SPRAYS ON BRYOPHYLLUM Charles Bradley Held, Butler High School, 600 South Dixie Drive, Vandalia, Ohio 45377

10:00

Lysol Brand Disinfectant, Guardsman Furniture Polish and Raid House and Garden Bug Killer were tested from distances of one and two feet, on species of Bryophyllum. The physiological effect was localized and proved lethal to the foilage that was exposed to spray. The species is still being observed to note changes from generation to generation.

MEDICINAL PLANTS CONCERNING THE HUMAN BODY SYSTEMS. Charlette N. Mingle, 542 Margaret Dr., Fairborn, Ohio 45324

10:15 In present times, synthetic drugs are replacing the use of natural medicines obtained from plants. If the use of natural medicinal substances is allowed to continue, new drugs may be discovered.

The purpose of my research is to find a correlation between a plant's evolution and its medicinal use affecting the human body systems. A common plant organ is looked for as well as a dominating plant classification. The plants' history and present use have been researched. Consulted references are the U.S. Pharmacopoeia and the National Formulary. Two hundred thirty plants have been reviewed in their Divisions, Class, Order, and Family. The information I obtained is graphed, and the results of this research may provide a foundation for further plant studies in medicine.

A Z80 MICROPROCESSOR DRIVEN COSMIC RAY TELESCOPE

Robert M. Sturgill
1156 Juliet Dr.
Toledo, Ohio 43614

10:30

It is the object of this project to construct a usable cosmic ray telescope. Two Geiger-Muller tubes and lead shielding form the body of the telescope. The telescope is mounted on a platform that can rotate on two axis. The line formed between the tubes indicates the direction of reception. Non-coincidental counts are ignored. Lead shielding provides isolation from ground clutter radiation and from showers of low energy particles formed in the atmosphere.

A custom microprocessor system was designed to log the data received. The system utilizes the Z80 microprocessor and 4K of static RAM. A CRT display and keyboard were designed with multi-level interrupts. This system permits the telescope to be used for long periods of time when a human operator might be unavailable.

Particles received are logged in memory with data indicating the time and the direction of the telescope. All data is dumped at one time via the CRT for analysis. A comparison to the $\cos^2$ incidence discussed by Gould and Ives is made.

N. JUNIOR ACADEMY

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 313

CARRIE W. RINKER, PRESIDING

1:30 BUSINESS MEETING

VISUAL EFFECTS OF SHAMPOO ON HAIR Christopher J. Omlor, Butler High School, 600 So. Dixie Drive, Vandalia, Ohio 45377

1:45

Shampoos are used to keep our hair clean, but are these shampoos always helpful to our hair? What do these shampoos do to our hair? It is the objective of this paper to find out what effects four shampoos have on the hair, and if damage is found, to determine the cause.

Hair samples were treated in the four shampoos. The surface of the hair was then examined

using a Scanning Electron Microscope to determine external damage, if any. The samples were then microtomed (cut cross-sectional) so that the internal structure could be studied. KEVEX X-ray analysis was performed on both sets of prepared samples for element analysis.

From results obtained it was found that excessive amounts of sulfur and sodium caused visual damage in sample: #1, Breck, #2, Silkience and #3, Pert Shampoos. Although sodium and sulfur were found in all five samples, silicon protected the hair in #4, Prell Shampoo. In #5 the control, sulfur and sodium were found, but were not in large enough quantity to cause damage. When researching this project it was found that sulfur and sodium containing chemicals are used to dissolve albuminoid protein.

EATING THE LEARNT TO LEARN

Diane Willford
10-615 Rd. J R. 1
Malinta, Ohio 43535

2:00

The main purpose of my project is to understand the functional relationship that exists between a complex nervous system and its environment. Therefore, we must start obtaining information about the behavior of nervous systems belonging to simpler organisms.

In the T-maze, there is a positive and negative goal. The negative goal (the left arm), very rough sand paper was placed. The positive goal (the right arm), very moist soil was placed. Feeding the worms trained worms and the Diurnal Cycle, had effects on the rate of their learning ability. The worms that ate the trained worms learned faster than the worms that did not eat the trained worms. The worms that were trained from 4:00 to 6:00 p.m. learned faster than worms from 4:00 to 6:00 a.m. Operant and classical learning were used to teach the worms to turn in the right direction. If the worm went to the positive goal seven consecutive times it was considered a success in training the worm to turn in a right direction.

Further research was done to study the learning behavior of Lumbricus terrestris.

THE INFLUENCE OF A HYPERBARIC ENVIRONMENT ON THE GROWTH RATE OF PLANTS AND MICROSCOPIC ANIMALS. Philip James Winchell. 3840 Schirtzinger Road. Columbus, Ohio. 43220.

2:15

Available evidence is very scarce as to whether or not pressure alters the rate of growth of various representative organisms. This research attempts to determine if pressure does have an effect and in what proportion at different pressures. A self-conceived, designed, and constructed (except for welding) pressure chamber, capable of exerting a pressure of up to 150 psi and working off of high pressure air, was used. Six organisms were chosen for study: Paramecium caudatum, Euglena gracilis, Elodea canadensis, Zea mays (corn), Phaseolus vulgaris (bean), and yeast. Experimental samples were individually tested in the chamber under varying pounds of pressure: 50, 100, and 150 psi. Control samples were grown under standard conditions. Heat and light were kept the same for both groups. Counting was done with a Spencer-Buffalo microscope with 100x, 440x, and oil immersion 950x lens using the grid method. Results show: (1) growth rate of every experimental sample was negatively effected by pressure; (2) all experimental samples grew proportionately slower at all pressures than the control groups at normal pressures; (3) some experimental colonies were completely wiped out at higher pressures; and (4) no positive effects occurred for experimental organisms. I conclude that the samples tested do not thrive under increased pressure perhaps because of the failure of a cell to rid itself of waste material (carbon dioxide, potassium) or that enzymes vital to cell function were destroyed or made inoperable by increased pressure. My third year of research studies pressure's effect on antibiotics.

COMPUTER AIDED INSTRUCTION IN HISTORY

John C. Feltz
573 Cherryhill Pl., Fairborn, OH 45324

2:30

This paper reports an experiment conducted to study the use of computer aided instruction (CAI) for teaching social studies. The migration of the North American Indian into and through North American was chosen as the topic. A written pretest was given to determine a knowledge baseline and provide a way to select the control and experimental groups. The control group learned through a short lecture, sample questions and lecture note handout. The experimental group learned through a computer program which was designed and programmed in BASIC on an APPLE II microcomputer. All students were given a written test afterwards to determine their amount of learning. The mean scores of the groups were compared.

Several aspects of CAI programming are considered in this presentation. The use of parsing routines for multiple word and short essay questions require the student to think more and avoid guessing. Presentation loops allow students with difficulties in a specific subject area to be given the same material in several different wordings or forms.

Several statistical methods are used to evaluate results. Among these are selection of control and experimental groups, baselines by a pretest, learning retention tests, and comparisons of improvement by knowledge levels. The latter is used to determine whether a certain learning program would be best suited for teaching advanced students, students with learning disabilities, or the average classroom pupil.

"OPTICAL MODULATION AND REMOTE SENSING". William Mark Swarner, 222 Ballard Drive, Gahanna, Ohio 43230.

2:45 The purpose of the proposed research is to build, compare, and evaluate two types of inexpensive optical modulators which may be useful in laser communications links, and as a secondary objective to determine the effectiveness of a laser in remote sensing of atmospheric particles.

To begin the project, a Helium-Neon (HeNe) laser will be constructed. It will be approximately a 2.0 milliwatt laser. Several experiments will be conducted over the course of two years. During the first year, the laser will be built, a particle counter formed and a communications link set up. To construct the laser, a laser tube will be purchased and a power supply and various other components obtained. The laser will be used to build a particle counter and a communications link using optical modulation.

REDUCING THE COST OF HOT AIR SOLAR COLLECTORS,
James McAleese, 47149 Bursley Road, Wellington, OH 44090

3:00 The hot air solar collector is ideally suited for residential heating purposes due to its relative simplicity when compared to the hot water collector. But even with this advantage, the cost of present day hot air collectors remains substantial and is definitely an obstacle to the universal use of solar today. In order to overcome the cost obstacle a design is developed that minimizes the cost as well as optimizes the solar performance of the collector. The program is broad based in that several topics are included: 1)Motion of the sun as a function of time of day and month; 2)Solar thermal input as a function of time of day, week, and month; 3)Evaluation of several types of reflectors such as single and double vees; 4)Effect of a vacuum on thermal losses; and 5)Evaluation of size and flow rates on thermal performance. Careful attention is paid to experimental procedures in each test series so that the effect of changing one variable can be developed from the test data, as well as determining the coupling of one variable to the others. The performance and temperature increase are determined for angles of the concentrator, various angles of the sun, and different wind speeds. Conclusions are drawn regarding the optimum use of the solar collector, plus the synthesis of a hot air collector system using each of the concepts denoted above. Final comparisons having been deduced, recommendations are then made to the residential builder and homeowner for greatest cost efficiency.

THE UPLAND SANDPIPER IN OHIO. A. Townsend Peterson and David R. Osborne, Department of Zoology, Miami University, Oxford, OH 45056.

3:15 A survey of the status of the Upland Sandpiper (Bartramia longicauda) in Ohio was conducted to determine habitat preference and trends in populations over the last hundred years. Upland Sandpipers declined in probable breeding distribution from 79 of 88 counties (89.7%) before 1937 to 15 of 88 counties (17%) since 1937. The average number of sandpipers reported at each station per season declined from 8-14 individuals before 1950 to 3-5 birds since 1970. Sizes of summer breeding flocks ranged from 1-51 birds, but singles and pairs were the most frequent flock size reported. Upland Sandpipers prefer airport habitats residing in such areas 4 times as often as all other grassland habitats combined. Results show the drastic decline in distribution and flock size of Upland Sandpipers in Ohio and suggests the remaining small populations are heavily dependent upon airport habitats for breeding. These findings are important to future studies and management practices for any recovery program planned for this endangered species.

THE EFFECTS OF HERBIVORY ON HERACLEUM LANATUM. Paul A. Peller. 222 23st. N.W. Canton, Ohio 44709.

3:30 The purpose of this experiment was to determine if the plant's fitness, as measured by the number of seeds produced, was altered in any way by insect damage, and if this alteration was affected by plant size or by the amount of sunlight received.

Further investigations included a quantitative measure of the plant's sex expression and ability to compensate for seed loss.

Two sets of 15 plants were located and tagged: 15 control plants that were not attacked, and 15 experimental plants with two insect larvae (Depressaria pastinacella) placed in the center of the primary umbel and wrapped in a cloth "bootie" to ensure insect attack. In addition, the total number of seeds of each umbel were counted in order to measure the plant's reproductive capability for seed loss due to insect attack. Sex expression in each umbel was determined by counting the number of male and female flowers.

Results indicated that destruction of the primary umbel leads to increased seed production and a greater percentage of hermaphroditic flowers on the secondary umbels of the attacked plants as opposed to the unattacked ones. In addition, the seed production on the secondary umbels compensated for 61% of the seeds destroyed, and plant size increased seed production on the experimental plant's secondary umbel.

THE UTILIZATION OF TAMOXIFEN AS A COMBATANT OF OSTESARTHRITIC DISEASE,
Kelly McAleese, 47149 Bursley Road, OH 44090

3:45 Tamoxifen, an estradiol antagonist, and estradiol were separately evaluated in an experimentally-induced model of osteoarthritis. Cartilage from anatomically-defined regions of individual rabbit knees was assayed for sulfate and thymidine incorporation. Tamoxifen reduced erosive osteoarthritic pathology while estradiol worsened it. There was no effect on the incidence of osteophytes. Metabolic studies in organ culture showed no variations relating to pathology or treatment. Osteophyte sulfate incorporation was significantly different, quantitatively and qualitatively, from adjacent articular cartilage. A model of experimental osteoarthritis induced following partial medial meniscectomy of rabbits was utilized. The rabbits underwent partial medial meniscectomy of the right knee. Left unoperated knees were also studied. These were not considered to be normal because they were subject to abnormal stresses as a result of the operation performed on the right knee. They served as morphologically normal controls that had been subjected to the same systemic therapy as osteoarthritic knees.

Three groups of animals, 17 in each, were studied. Group I received a placebo, sesame oil, intramuscularly. Group II rabbits received estradiol valerate in sesame oil. Group III rabbits received tamoxifen base in sesame oil 1M dose. Rabbits were sacrificed 12 weeks post partial meniscectomy. The initial and final mean weight of animals in each group were comparable.

THE APPEARANCE OF CERTAIN LUNAR SURFACE FEATURES RECORDED AT THE DIFFERENT POSITIONS OF THE MOON IN LUNAR ORBIT
4:00 By: Chuck Fields 6406 Mayflower Ave. Golf Manor, Ohio 45237

An experiment was conducted using a 35mm camera by taking pictures of the lunar surface. Pictures were taken through a telescope with an objective 6" in diameter. The process known as eyepiece projection was used in this experiment. This process was accomplished by projecting an image from the eyepiece an additional $3\frac{1}{2}$" to the film plane of the camera. Therefore, the original image would be magnified 2-3 times.

It was hypothesized that photographs taken of certain lunar surface features at the varying positions of the moon in orbit, then each photograph would record a different amount of detail for the object being photographed. It was also hypothesized that a different exposure would be needed for each position of the lunar surface feature being photographed on the moon.

Results indicate that the different images of the lunar features do indeed show a varying amount of detail according to the position of the moon when photographed. Results also indicate that the exposure differs according to the position of the object being photographed on the lunar surface.

WASTE CHEMICALS RECLAMATION. Kenny Brown and Dr. James Lacksonen. Chemical Eng'r. Dept. ,The University of Toledo, Toledo, Ohio 43606.

4:15 Fuel conservation and environmental problems are very important in engineering. The disposal of carbonous materials contributes to both fuel consumption and to environmental wastes. Some industrial processes are conducive to solving both of these modern problems. One such industry is sulfuric acid manufacturing. The waste from another industry or municipality can become one of the raw materials for sulfuric acid production. In particular, the use of wood by-products, leaves, etc. have been hydrolyzed with concentrated waste sulfuric acid from the petroleum industry. The wood materials serve as supplemental fuel which replaces natural gas or fuel oil which would otherwise have to be

used to supply the required energy. Additional wastes with energy value which can be burned with sulfuric acid can also be used. Such processing methods can reduce the energy requirements of one process while handling wastes from another industry or from a municipality. This work was conducted in a commercially operating sulfuric acid plant in Toledo, Ohio.

O. ENGINEERING

SATURDAY APRIL 24, 1982

DURING THE MORNING THE ENGINEERING SECTION WILL NOT MEET. ALL PAPERS WILL BE PRESENTED IN OTHER SECTIONS. SEE AFTERNOON SESSION FOR ROBOTICS SYMPOSIUM.

D. MEDICAL SCIENCES

COMPUTER SIMULATION AND ANALYSIS OF FIRST-TRANSIT CARDIAC RADIONUCLIDE DILUTION CURVES. L. R. Low.

ON THE ANALYTICAL AND EXPERIMENTAL STUDIES OF HUMAN FEMUR. D. D. Raftopoulos and J. D. Baril.

ANALYSIS OF THE FIRST HEART SOUND IN ORDER TO CHARACTERIZE ITS WAVEFORM. Rhonda L. Roberts and Herman R. Weed.

FAST HYBRID SIMULATION OF CARDIAC ELECTRICAL ACTIVITY. T. J. Kraus, J. Duerk and R. Wilson.

NON-INVASIVE DIAGNOSTIC METHODS OF CEREBROVASCULAR DISEASE. J. P. Hayes and W. E. Evans.

HYBRID DATA ACQUISITION OF LOW VOLTAGE CELL GENERATOR POTENTIALS. Ralph H. Wilson.

PLANNING THE ORGANIZATION AND TRAINING FOR BIOMEDICAL ENGINEERING TECHNOLOGY PERSONNEL AND FACILITIES IN HEALTH CARE SYSTEMS. H. R. Weed.

A DISPLAY SYSTEM FOR THE MAGNETIC FIELD REMOTE POSITION AND ORIENTATION SENSOR (CATHETER POSITION AND ORIENTATION SENSOR). N. Wali.

DYNAMIC SPECTRAL ANALYSIS OF THE MYOELECTRIC SIGNALS DURING DOWNHILL FATIGUING EXERCISE. Aly A. Farag and R. M. Campbell.

ELECTRICAL CONTROL AND SIGNAL SIMULATION OF CARDIAC CONDUCTION. J. L. Duerk and T. J. Kraus.

E. PHYSICS AND ASTRONOMY

MELTING OF ICE SPHERES IN FLOWING WATER. G. S. Jakubowski, V. Eskandari and T. G. Keith.

L. MATHEMATICS AND COMPUTER SCIENCE

COMPARISON OF CORRELATION AND INVERSION TECHNIQUES FOR TOMOGRAPHIC IMAGE RECONSTRUCTION FROM MULTIPLE-PINHOLE-CODED-APERTURE GAMMA-CAMERA DATA. J.. Farison, C. G. Daley, A. D. Nelson and L. T. Andrews.

A TECHNIQUE FOR THE DESIGN AND IMPLEMENTATION OF AN ADAPTIVE CONTROL SYSTEM. A. A. Ghandakly.

INDENTIFICATION OF THE CLASS OF DATA FLOW GRAPHS THAT CAN BE EMBEDDED INTO A DIRECTED PROCESSOR MESH. H. M. Standley.

N. JUNIOR ACADEMY

WASTE CHEMICALS RECLAMATION. K. Brown and J. W. Lacksonen.

P. ADMINISTRATIVE SCIENCES AND PLANNING

AN INTERNATIONAL COMPARISON OF INDUSTRIAL SAFETY. Francis J. Jankowski.

Q. ECONOMICS

THE KALMAN FILTER AS AN ADAPTIVE ARIMA MODEL. P. L. Sholl.

O. ENGINEERING

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 346

RUSSELL A. PRIMROSE, PRESIDING

1:30 BUSINESS MEETING

ROBOTICS SYMPOSIUM

THE INDUSTRIAL ROBOT AS TRANSFER DEVICE. Vernon L. Mangold, President, KOHOL Systems, Inc., P. O. Box 1185, Dayton, Ohio 45401.

2:00 There are two main types of transfer devices in today's industry: bulk transfer devices, which randomly placed parts; and orientation transfer devices, which hold the workpiece in position. Although a finished product is the result of a number of sequential operations, there are only two basic ways to configure station-to-station parts flow: for serial or for parallel manufacturing operations. In both serial and parallel cases, industrial robots have an advantage over traditional transfer devices. Industrial Robots are not limited to one fixed mode of operation. They can be programmed to perform both serial and parallel operations in one work area. However, as industrial robots take their place in today's industry, we find that they are generally used in tool handling applications such as welding or spray painting, which leaves transfer applications for industrial robots at a tremendously untapped potential.

DESIGN OF A PORTABLE INSTRUMENTATION ROBOT FOR AUTOMATING ACOUSTIC INTENSITY ANALYSIS. John Coy, Ivan Morse, Dave Stephens, Will Atherton and Patrick Flanagan, The University of Cincinnati, Dept. of Mechanical and Industrial Engineering, Mail Location 72, Cincinnati, Ohio 45221.

2:15 Advances in acoustic intensity techniques have improved the accuracy of measuring sound fields in reverberant areas. Since most acoustic intensity measuring systems use hand-held probes to "scan" the sound field, the test procedure is labor intensive and suffers from poor probe position data. In addition, some noise generators, i.e., helicopter transmissions, are potentially hazardous in their experimental environment, requiring a remotely controlled manipulator for acoustic intensity analysis.

A portable robot arm to position a multimicrophone acoustic intensity probe was designed and constructed. The robot arm has a 45 inch reach and is typically mounted on a tripod. The arm weighs less than 50 pounds and can be disassembled for transportation in two suitcases. The robot's "scan" algorithms are preprogrammed in a MC 68000 based digital control unit. The D.C.U. is interfaced to an H.P. 9845 calculator/computer which selects the type of scan desired. The acoustic intensity program housed in the H.P. 9845 coordinates the D.C.U. scan mode with the H.P. 5423 spectrum analyzer results. The design, simulation and analysis procedure for this robot is presented.

SOME ROBOTICS DESIGN SOLUTIONS ARE SUGGESTED BY BIOLOGICAL MODELS. Dr. Dana B. Rogers, Box 24268, Dayton, Ohio 45424.

2:30 Robotics technologies represent a broad range of interdisciplinary research and applications areas. The importance of this technology base is already recognized as the next major step in industrial and process operations. The currently recognized

problems in this exciting technology have been categorized in the areas of intelligence and decision making, control, manipulation, locomotion, sensors, and communication. The solution to many of the problems in robotic applications may be suggested in the study of biological systems models. For example, the study of intelligence and decision making is approached by some researchers through investigation of language structures. Some studies in control are carried out by observation of the human response to dynamic task problems. However, the human as a model represents a system with multiple redundant operating modes. This paper explores some of the possibly useful ways that the human organism can provide answers to challenges in robotics design and application. Some caveats are also highlighted wherein the observed elegance of the system may hamper an economic engineering solution.

DESIGN OF A COMPUTER-CONTROLLED INDUSTRIAL ROBOT FOR MAXIMUM APPLICATION FLEXIBILITY. Ronald L. Tarvin, Research Associate, Robot Research, Dept. 03E, Cincinnati Milacron, Inc., 4701 Marburg Avenue, Cincinnati, Ohio 45209.

2:45

This paper discusses the capability inherent in the Cincinnati Milacron T3 robot system -- a system that is engineered to make maximum use of a control computer. The greater control one has over the arm during both teaching and automatic operation is explained. The role of the computer in complex decision making and data manipulation is considered. Communications interfacing with other computers is mentioned. Finally, the technique of computer-controlled stationary-base tracking is discussed as it applies to assembly line operations. All of these topics serve to illustrate the flexibility achieved with computer control.

THE NORDSON ROBOT SYSTEM. Ernie Fena, Technical Training Manager, Robotics Division, Nordson Corporation, 4937 Mills Industrial Park, North Ridgeville, OH 44039.

3:00

The Nordson Robot System consists of three components: electronic control console, hydraulic power pack, and manipulator. An optional remote programming arm permits generation of programs without taking the robot out of production and eliminates the need for the painter/programmer to move the bulky manipulator about. The Nordson Robot provides 6 axis, continuous path movement. A 20 minute film and comments will be presented.

THE IMPACT OF ROBOTICS UPON EDUCATION. Dr. Russell A. Primrose, Dean, School of Engineering, University of Dayton, Dayton, OH 45469.

3:30

The challenges of the computer age continues. The pocket calculator replaced the slide rule causing the need for altered testing and presentation methods in the classroom. The microcomputer brought decentralized computing and eased the increasing load on the central computer unit on a campus with speed, efficiency and cost effectiveness that was surprising. The computer was incorporated as an aid to graphics, to design and to manufacturing operations. Use of these aids is no longer an option in the educational process.

Now we are experiencing the influx of robotics into our society--with all of the resulting impacts and problems. Are there ethical problems to be considered? How do you handle the psychological impact of job replacement by a robot? How will the increased precision of the robot be of benefit? But more basic to the university: What educational content will be expected of our programs? What is necessary to retrofit those becoming obsolete in the face of this technological wave? Are there other moral, ethical, technological or educational problems involved? Our continued success will depend upon a successful solution to the impact of robotics upon education.

P. ADMINISTRATIVE SCIENCES AND PLANNING

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 209

GARY S. GAPPERT, PRESIDING

"FUTURE ISSUES IN PUBLIC ADMINISTRATION AND PLANNING"

WOMEN IN LOCAL GOVERNMENT
Dr. Carole G. Garrison; P. J. Blanchard; and S. J. Wood, The Department of Urban Studies, The University of Akron, Akron, Ohio 44325

9:00

In most local governments affirmative action programs have been in effect for about a decade. This study will address the cumulative effects of governmental affirma-

tive action guidelines and the changing national consciousness resulting from the women's rights movement on the numbers of women who are getting municipal level administrative jobs, or in the amount of influence or power those women wield compared with the past.

A survey* is being administered to both male and female local municipal managers in Summit County, Ohio to identify changes in employment and promotional opportunities for women in the urban management field. These findings, while regional in nature should provide insight into the Ohio experience.

*Adapted from: Ruth Burns, Women in Public Service, Vol. 1, U.S. Department of Housing and Urban Development, Office of Policy Development and Research, March, 1980.

MANAGEMENT OF A FUTURES PERSPECTIVE AND POLICY DEVELOPMENT
Gary S. Gappert, Director, Institute for Future Studies and Research,
9:30 the University of Akron

Based upon planning experience in the public and private sector this presentation will reflect ways in which a future's perspective can be useful for policy development. Specific reference will be made to the State of Ohio.

THE IMPACT OF SOCIAL SERVICE CUTBACKS ON WOMEN AS A LABOR RESOURCE
E. S. Breen and L. H. Beazlie, Department of Urban Studies, The University
10:00 of Akron, Akron, Ohio 44325

The last 50 years have seen an expansion and development in social services programs, including type, quality, direction, and people eligible. Correspondingly, women have been entering the labor force in greater numbers. The main assumption in this paper is that the increase in certain social service provisions has benefited women directly and enabled them to participate more in the labor market. The purpose of the paper is to assess the impact of cutbacks in social services on women's ability to be waged laborers.

The situation in England will be compared to that of the United States. Both countries have been experiencing economic difficulties and the response by the respective governments has been similar. The differences are that in England the implementation of conservative, fiscal policy has been further along whereas in America it has only just begun.

Marxist-Feminist theory will be used to explain the experience in England and to predict the future experience of women in the U.S.

AN INTERNATIONAL COMPARISON OF INDUSTRIAL SAFETY. Francis J. Jankowski, Wright State University, Dayton, Ohio 45435.

10:30 Industrial accident statistics from other countries are difficult to obtain. The most detailed data are Japanese of 1955 through 1967. During this period the USA lost-time industrial accident rate was 60 percent greater than Japan's. Recent fatality rate statistics show Japan, Holland and the United Kingdom having better safety records than the USA, with France having a poorer safety record. Tentative hypotheses to explain some of the differences are: Holland may have different types of industry; the United Kingdom has lower productivity in some industrial fields; Japan has a management system which leads to individuals having greater participation and taking more responsibility for their work. The long range objective of this study is to identify causes and factors in industrial safety and to apply these to improving safety in the U.S.A.

P. ADMINISTRATIVE SCIENCES AND PLANNING

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 209

PETER J. LEAHY, PRESIDING

1:30 BUSINESS MEETING

2:00 EVALUATION OF A CITY-WIDE PUBLIC HEALTH SCREENING PROGRAM.
Neil M. Casey, Akron Health Department, 177 South Broadway, Akron, Ohio 44308

The Akron Health Department is conducting an ongoing high blood pressure screening and detection program. This project is funded through a grant from the Ohio Department of Health. Specific objectives regarding the number and demographic composition of the screened population were stipulated in the original grant proposal. This paper begins by discussing the concepts and the motivation behind the project. The three models used in program evaluation (casual, intervention, action) are then presented. The project objectives are discussed with a view toward reducing their ambuiguity. A detailed breakdown on the distribution of the project population is presented followed by the plan for delivering the screening services to this target group.

The balance of the paper discusses the evaluation plan developed for this project. The monitoring evaluation utilizing computerized data collection to determine whether the target population is being reached is presented. A potential programmatic impact assessment plan, which addresses both the individual and community levels, is discussed. Finally, the three main threats to validity (internal, external, construct) are presented and discussed.

In conclusion, the six-month interim monitoring evaluation report will be presented. This will include presentation of the screened population figures along with a discussion on the status of the project's likelihood of reaching it's stated target population objective. Possible changes in service delivery methodology will also be discussed if the interim data suggests such a discussion is warranted.

2:30 A PROBLEM-ORIENTED PLANNING PROCESS FOR HUMAN SERVICES
Anne F. Terrill, Ph.D. Executive Director, Metropolitan Human Services Commission, 55 West State Street, Akron, Ohio 44308

The Metropolitan Human Services Commission (MHSC), a coordinating body in Summit County, modelled after the Franklin County MHSC, spans both public and privately supported human service agencies. MHSC has developed a planning process for human services to enable the twelve major funding bodies in the County to target their diminishing resources to areas of greatest need.

The technical planning process is comprised of four steps: 1) Conduct a problem-oriented phone survey to 1,000 randomly selected Summit County residents. This process will yield a ranking of human problems based upon perceived need and incidence; 2) List services available which address each problem, their budgets, the numbers of clients served and the sources of their funding; 3) Calculate the total community dollars spent for services in 1981; estimate dollars available in 1982 to obtain degree of impact; 4) Develop funding strategies to ensure that critical services can be maintained for high ranking problem areas.

The presentation will address the research methodology as well as three aspects of this process; The systems-view of human service planning; the levels of necessary participative involvement; and the use of the data in the development of human service futures.

3:00 MEASURING CLIENT SATISFACTION WITH A HOME-BASED HOSPICE PROGRAM.
T. Neal Garland, Department of Sociology, University of Akron, Akron, Ohio 44325.

Hospice programs are designed to meet the needs of terminally ill patients and the members of their families as completely as possible. Measurement of the degree to which such programs have accomplished their goals has been difficult because of the extremely stressful nature of the patients' and families' situation. This paper describes a format developed to measure client satisfaction with services delivered by a home-based hospice program located in northeastern Ohio. The patient and his or her primary caregiver--the family member or friend who accepts major responsibility for taking care of the patient while he or she is at home--are considered as a single sampling unit. Data are collected from primary caregivers, who are asked at the time their patients enter the program to estimate the extent to which they and their patients are experiencing certain needs. Five months after the patient dies, the primary caregiver is asked to respond to a second questionnaire which calls for estimates of the extent to which these needs were met for the patients and themselves during the time the patients were enrolled in the hospice program. Strengths and weaknesses of this approach to evaluating client satisfaction are discussed.

3:30 IS RACE OR SOCIAL CLASS MORE IMPORTANT IN DETERMINING MORTGAGE LENDING PRACTICES?: A LONGITUDINAL ANALYSIS
David J. Benedetti, Planning Consultant, Wilkes-Barre, Pennsylvania and Peter J. Leahy, Assistant Professor, Department of Urban Studies, The University of Akron, Akron, Ohio 44325

Data on Home Improvement and Home Financing Loans from the 12 principal Akron SMSA

banks and savings and loans were obtained under the Mortgage Home Loan Disclosure Act of 1975. Data were obtained for the 1977-80 period. This study tests the hypothesis that race is a crucial variable in the allocation of home mortgage money, as opposed to class. The methodological difficulties of a "pure" test of this hypothesis are discussed. Multiple methodological approaches are utilized, including frequency matching and partial correlation analysis. The data support the hypothesis for FHA loans but not for conventional mortgage money. The implications of the results for policy are discussed.

Q. ECONOMICS

MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 346

HERMAN J. EICHEL, PRESIDING

PLANT GENETICS: NEW AND OLD TECHNOLOGIES IMPACTING AGRICULTURE

Robin L. Gatz and Cynthia K. Wagner
Battelle Columbus Division
505 King Avenue
Columbus, Ohio 43201

9:15

Advances in plant genetics provide the potential for augmenting the conventional breeding tools used in the development of new crops and improvement of existing ones. Present crop improvement procedures predominantly involve the direct and indirect manipulation of the genetic complement of plants. New biological tools such as plant tissue culture and recombinant DNA techniques potentially can be combined with conventional plant breeding to achieve new and improved crop cultivars. These methods may contribute to the development of crops that provide higher nutritional levels, are resistant to disease, have the ability to grow in stressful environments, etc. Although these potential advances have exciting possibilities, a considerable amount of basic research to increase scientific knowledge of the genetics, biochemistry, and physiology of plants will be needed before major changes in agriculture occur. Some of the potential applications of plant genetics techniques and their associated technical and economic feasibility will be discussed.

HARNESSING WEALTH FROM WASTE, George D. Moon, Jr., Vice President, Raphael Katzen Associates International, Inc., 1050 Delta Ave., Cincinnati, Ohio 45208

9:30

Dwindling world petroleum reserves and ever-increasing production of municipal solid wastes represent two major problems which must be technically and economically addressed if future generations are to maintain reasonable standards with regard to quality of life.

Newly emerging technologies in the areas of genetic mutation and biomass collection and utilization will effect technically and economically feasible solutions to these national problems during the decade of the 80's.

This presentation will review current research and development efforts in these areas and will address some of the problems attendant to the establishment of new industries capable of producing and effectively marketing chemical precursors, liquid fuels, energy, and other useful by-products resulting therefrom. Potential solutions to the problems associated with this new and necessary industrial growth will be suggested.

LOCATION PATTERN OF BRANCH MANUFACTURING PLANTS IN NONMETROPOLITAN OHIO

Bruce W. Smith, Department of Geography, Bowling Green State University, Bowling Green, OH 43403

9:45

One important trend in the geography of manufacturing in the United States has been the decentralization of branch plants into nonmetropolitan areas. Some experts suggest that this phenomena is the result of firms, using standardized production processes, seeking locations of cheaper labor.

The purpose of this paper is to analyze the location pattern of branch manufacturing plants in nonmetropolitan Ohio. More specifically, the research will describe the Ohio location pattern of branch plants and analyze selected factors which are related to the location of branch plants, such as wage rates.

THE KALMAN FILTER AS AN ADAPTIVE ARIMA MODEL. Patricia L. Sholl. 5063 Secor Rd. #8, Toledo, Ohio 43623.

10:00

The Kalman filter is a signal prediction algorithm developed for dynamic systems in a state variable formulation, originally with control and guidance applications in the space program. Its potential application to time series analysis and economic forecasting has been noted in the literature. This presentation reports on the formulation and experimental results (both simulation and actual industrial data) for the Kalman filter application to parameter estimation and updating for autoregressive-integrated-moving-average (ARIMA) economic models. These results show that the Kalman filter may be used to make the ARIMA models truly adaptive. The filter is able to provide good forecasts with much less data and revises the coefficients with each observation. In addition, the problem of model selection has been solved by the use of a general model, a feat which is not possible with the usual ARIMA parameter estimation procedures. The use of the "KARMA" (Kalman filter-autoregressive-moving-average) form is also extended to seasonal series. The results indicate that the KARMA method is preferable to the ARIMA methods presently used.

MARKET STRUCTURE IN HOSPITALS. Robert J. Caswell, Graduate Program in Hospital and Health Services Administration, The Ohio State University, 1583 Perry Street, Columbus, Ohio 43210.

10:15

Several alternative measures of hospital market structure are examined using data on individual institutions from the American Hospital Association Annual Surveys of Hospitals 1969-1978. Most measures emphasize market concentration (e.g., Herfindahl index, concentration ratios) with the market defined in spatial terms. Measures of structure are shown to be very sensitive to the particular spatial definition of the market which is chosen. Common indicators of hospital performance (e.g., cost per patient day) are then regressed on these structural variables and other explanatory variables. Regressions are estimated both in levels and first differences of the prinicipal variables. The results appear to show that competition in the traditional sense of low market concentration does not improve market performance of hospitals. The relationship of this finding to current public policy emphasis on promoting competition is discussed.

Q. ECONOMICS

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 214

HERMAN J. EICHEL, PRESIDING

1:30 BUSINESS MEETING

R. ECOLOGY

FIRST MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 265

RESULTS OF A TROPHIC CLASSIFICATION OF OHIO LAKES. John D. Youger Ohio Environmental Protection Agency, 361 E. Broad St., Columbus, Ohio, 43215.

8:30

Between 1975 and 1981, the Ohio E.P.A. made water quality determinations of 107 Ohio lakes. Trophic levels were determined using Carlson's Trophic State Index and chemical and biological data from these surveys and other published sources. Carlson's lake classification scheme uses chlorophyll a, Secchi disk, and total phosphorus values and three specific equations to generate Trophic State Index (TSI) values. The TSI values can be related to the traditional trophic level nomenclature. Seventy-five percent of the lakes were found to be eutrophic, 15% mesotrophic, and 10% hypereutrophic. Most of the mesotrophic lakes were located in southeastern Ohio. In 12 cases where data from several years were available, changes in the TSI were determined. It is not clear at this time whether the observed changes are significant or constitute normal biological variation. The data collected in these surveys form a baseline from which future changes in Ohio lakes can be measured.

8:45 UPTAKE AND PHOTODEPENDENT RELEASE OF PHOSPHATE FROM AQUATIC HUMIC MATERIALS. Robert T. Heath. Department of Biological Sciences, Kent State University, Kent, Ohio 44242.

The relationship between phosphate and iron-containing humic materials dissolved in the water of a relic bog in northeastern Ohio (Triangle Bog, Portage County) was investigated. Orthophosphate absorbed to iron-containing humic materials dissolved in bog waters when the iron is in the ferric (Fe III) state; this sorbed phosphate is released on photoreduction of Fe III to Fe II by low doses of ultraviolet light present in sunlight at the surface of the bog. $^{32}P\text{-}PO_4$ labeling experiments on filtered bog water indicated that sorption of phosphate to high molecular weight (>100,000 daltons) dissolved humic material occurs abiotically. Sorbed $^{32}P\text{-}PO_4$ may be released on UV irradiation as a low molecular weight fragment distinct from orthophosphate.

9:00 ALUMINUM SULFATE TREATMENT AND BIOTIC INFLUENCE ON THE UPTAKE AND RELEASE OF PHOSPHORUS FROM SEDIMENTS. Robert M. Kraus and Robert T. Heath. Department of Biological Sciences, Kent State University, Kent, Ohio 44242

Aluminum sulfate (Alum) applied to sediments serves as a long term (7 years) means of controlling P-availability. The rate and capacity for uptake and release of orthophosphate on profundal sediments from an alum treated lake (West Twin Lake) and a similar untreated lake (East Twin Lake) was investigated at a series of temperatures. Kinetic analysis of aerobic phosphate uptake indicated that alum-treated sediments continue to absorb more phosphate at a higher rate and to a greater extent than untreated sediments. Temperature analysis indicate that the benthic community contributes significantly to the uptake of phosphate by the sediments.

9:15 SOME ASPECTS OF SEDIMENT PHOSPHORUS DYNAMICS IN THE CUYAHOGA RIVER, NORTHEASTERN OHIO. Kurt W. Whitford and Robert T. Heath Department of Biology, Kent State University, Kent, Ohio 44240.

In an effort to understand better the role streams play in the enrichment of downstream impoundments, we investigated the ability of Cuyahoga River sediments to release and adsorb available phosphorus. Sediment, collected from 15 stations chosen on the basis of surrounding land use, was placed into BOD bottles filled with phosphorus-free water. As microbial activity reduced oxygen tension, the rate and extent of soluble reactive phosphorus(SRP) release was recorded. Sediment collected from marsh and urban parts of the river released more SRP faster than other areas. PO_4-P uptake experiments showed sediment with high potential release to have generally high uptake capacities. Seasonal variations in release and uptake potentials were also noted.

9:30 DETERMINING AVAILABLE PARTICULATE PHOSPHORUS AND NONAVAILABLE PARTICULATE PHOSPHORUS CONCENTRATIONS IN WATER FROM THE WESTERN AND CENTRAL BASINS OF LAKE ERIE. Gary Arico and Dr. Karl Svanks. Center for Lake Erie Area Research, The Ohio State University, 484 West 12th Avenue, Columbus, Ohio.

Total Phosphorus in Lake Erie can be considered as two forms: Available for biological uptake and Nonavailable for biological uptake. Available Phosphorus is either soluble inorganic or organic Phosphorus while Nonavailable Phosphorus is found as mineral complexes often as resuspended sediments in the water column.

The study will include methods of sampling, sample preparation and analysis. Preliminary results indicate approximately 65% of the Phosphorus in particulate form may be Nonavailable Phorphorus representing 40% of the Total Phosphorus in a lake sample.

Since Available Phosphorus loading in Lake Erie is given as Total Phosphorus, this 40% Nonavailable Phosphorus may be a significant factor when determining Phosphorus loading in Lake Erie.

9:45 THE EFFECT OF COMMON CARP (CYPRINUS CARPIO L.) ON THE MOBILIZATION OF SEDIMENT PHOSPHORUS. Paul W. Anderson and G. Dennis Cooke. Dept. of Biol. Sci., Kent State University, Kent, Ohio 44240

The common carp (Cyprinus carpio L.), a species of bottom feeding fish, was studied to determine its role in facilitating sediment phosphorus release in Geauga Lake, Ohio. Seven 3 m. diameter enclosures were placed in 1.5 m. of water and were monitored for two weeks. Four enclosures contained no fish, two of which were untreated controls and two which were stirred daily to stimulate the perturbation of sediments

by fish. The remaining three enclosures were stocked with fish (average weight 300 g.); two contained one fish and one contained four fish.

Enclosures with fish showed immediate changes characteristic of eutrophication, including increase in total phosphorus concentration (primarily as particulate phosphorus), increase in concentration of chlorophyll a, and a decrease in Secchi disk transparency. The control and stirred enclosures showed no changes in any of these factors. No changes in pH were observed in any enclosures.

It is concluded that common carp can be an important contributor of phosphorus to the water column of a lake through the mobilization of sediment phosphorus. This phosphorus is available to algae, as evidenced by the increase in chlorophyll a. Since no increase in phosphorus concentration was observed in the stirred enclosures, the increase in the enclosures with fish is not due to physical perturbation of the sediments and may be due to their digestive activities.

SOME EFFECTS OF LOWERED PH ON PERIPHYTON OF AN ARTIFICIAL STREAM Charles G. Maurice, Department of Biological Sciences, Bowling Green State University, Bowling Green, Ohio, 43403

10:00

This study examines the effect of lowered pH on the biomass and community composition of periphyton in an originally circumneutral artificial stream. Flora from two small, first order streams in the Upper Peninsula of Michigan were mixed and introduced into two artificial streams located in a greenhouse at the Michigan State University Kellogg Biological Station. The organisms were allowed to acclimate for about six months in these concrete-based streams which were 12m long, 1.5m wide, and 14 to 37cm deep. The streams were initially filled and later maintained with deionized well water chemically adjusted to mimic Upper Peninsula streams.

On 28 November 1980, 0.1N H_2SO_4 was dripped into one of the streams over a six hour period lowering the pH from 7.4 to 4.0 to remain between pH 4.0 and 4.3 for the course of the investigation. Periphyton colonization was observed in late fall and spring using periphytometers. Through general appearance and chlorophyll analysis, a significant decrease in periphyton biomass was observed in the acidified stream over both seasons when compared to the control stream. The effect of acidification on periphyton community composition is currently being determined and will be presented at the seminar.

RECENT AND POST-GLACIAL DIATOMS FROM SUMMIT LAKE, NORTHEASTERN OHIO. Jeffrey C. Gray 1139 Hawthorne Ave. S.W., Canton, Ohio 44710

10:15

Summit Lake is a moderately eutrophic, glacial kettle formation, located in N.E. Ohio.

One hundred thirty taxa of diatoms were identified from three core samples, representing recent (<200 years B.P.) and post-glacial (>200 years B.P.) sediments. The taxa occurring with a relatively high abundance in the post-glacial sediments were Cyclotella compta, C. kutzingiana, Cymbella diluviana, Fragilaria brevistriata, F. construens, F. pinnata, Mastogloia smithii var. lacustris, and Tabellaria quadrisepta. Diatoms most common in the recent sediments were Asterionella formosa, Cocconeis placentula, Cyclotella meneghiniana, Melosira granulata, Navicula graciloides, Nitzschia palea, Stephanodiscus astraea, and Synedra spp..

According to Morisita's index of community similarity, the most dissimilar diatom assemblages occurred between the recent and post-glacial sediments rather than between different core sites of the same sediment type. These major changes in species composition have occurred recently and probably are related to man's cultural activities such as deforestation, agriculture, and urbanization of the watershed.

ESTIMATION OF NEARSHORE PHYTOPLANKTON BIOMASS IN THE WESTERN BASIN OF LAKE ERIE. Daniel Z. Fisher. Center for Lake Erie Area Research, The Ohio State University, 484 West 12th Avenue, Columbus, Ohio 43210.

10:30

During 1978-1979 a study was undertaken to determine the composition of nearshore phytoplankton communities in the western basin of Lake Erie. Sample stations were selected within 7 predetermined areas along Michigan and Ohio coastline. These areas or reaches were selected to represent varying types of contributing land areas while stations were selected to compare phytoplankton biomass 0.2 to 2.0 km (inshore) and 4.5 to 7.0 km from shore (offshore).

The 1978 biomass data indicates the dominance of the blue-green algae throughout the comprehensive station pattern. The diatoms and green algae followed the blue-greens biomass trend as did the cryptophytes, dinoflagellates, and chrysophytes, at more reduced levels. The 1978 reach biomass totals indicate 3 reaches contained greater biomass than the remaining 4 areas. In addition, the inshore areas contributed significantly greater biomass than offshore areas.

The 1979 biomass data provided similar results as the previous year. The second year showed a narrower nearshore range of biomass values in comparison of algal groups over time and in comparison of reach totals for the second year.

10:45 A COMPARATIVE STUDY OF HARVESTING AND HERBICIDES FOR CONTROL OF NUISANCE AQUATIC PLANTS. Diane L. Conyers and G. Dennis Cooke. Department of Biological Science, Kent State University, Kent, Ohio 44242.

Aquatic vascular plants may interfere with the use of lakes and reservoirs. The decomposition of these plants adds nutrients to the water and contributes to an oxygen depletion. During Summer 1981 two methods of control, harvesting and herbicides, were compared for effectiveness and cost in side-by-side test plots in East Twin Lake, (Portage Co., Ohio). The dominant plant species in the experimental area were Potamogeton crispus in early summer changing to Ceratophyllum demersum and Chara sp. in mid and late summer. During the study period two applications of Cutrine-Plus and Diquat were made following the manufacturer's recommended doses. Plant biomass was not affected by the treatment and was always similar to the biomass of the control plot. The biomass of the harvested plot was small throughout the summer when compared to the control, and was 81% less at the end of summer than at the beginning. Harvesting was far more cost-effective in controlling macrophytes than the Cutrine-Diquat treatment.

R. ECOLOGY

SECOND MORNING SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 268

8:30 LITTERFALL AND NUTRIENT MINERALIZATION IN FOUR FOREST TYPES WITHIN A HETEROGENEOUS WATERSHED ECOSYSTEM. Ralph E.J. Boerner, Department of Botany, Ohio State University, Columbus, Ohio 43210.

Valley watershed ecosystems of the Allegheny Plateau region of southeastern Ohio are often vegetationally heterogeneous. Within a single valley, various combinations of elevation, slope aspect, microclimate and substrate produce forest types with differing canopy and understory species compositions. To determine the relative contribution of these diverse community types to whole watershed nutrient budgets, fluxes of nutrients in litterfall and rates of litter decomposition have been investigated in four stands within Neotoma Valley, Hocking County. These stands included a ridge top chestnut oak forest, a moist mixed mesophytic stand, a transitional red maple-chestnut oak stand, and a mixed oak forest. Both litterfall and nutrient mineralization varied among the four stand types. Factors influencing litterfall volumes included both species composition and stand density. Decomposition rate was related to both abiotic factors, including litter moisture and slope aspect, and factors related to canopy species composition, especially initial litter quality.

8:45 EFFECTS OF DIFFERENCES IN SIZE AND MORPHOLOGY ON SEEDLING ESTABLISHMENT SUCCESS. Katherine L. Gross. Department of Botany, 1735 Neil Avenue, Ohio State University, Columbus, Ohio, 43210.

The relative importance of differences in seed size and seedling morphology in determining a species ability to establish in various microsites was examined in a series of greenhouse experiments. Six monocarpic perennial ('biennial') plant species were selected for study: Verbascum thapsus, Oenothera biennis, Daucus carota, Dipsacus sylvestris, Tragopogon dubius, and Arctium minus. Seed size ranged over two orders of magnitude in these species, from 0.07 mg in Verbascum to 9.1 mg in Arctium. The six species were divided into two morphology groups based on differences in their growth form immediately following germination: broad and flat (Verbascum, Oenothera, Dipsacus, and Arctium) vs. narrow and erect (Daucus and Tragopogon). Seeds of each were sown separately onto trays prepared to mimic several different field microsites: bare soil, litter (1, 3, and 5 cm), and vegetated.

Emergence and survival of all 6 species was highest in bare soil and 1-cm litter cover microsites. In deep litter and vegetated microsites, emergence and survival of Verbascum and Oenothera was significantly reduced, but there was no effect on the 4 larger-seeded species. Growth of all 6 species was significantly lower in vegetated microsites than in litter or bare soil; however, species with small seeds were more strongly effected than those with large seeds. Seedling morphology was not a significant factor in determining the ability of these species to establish and grow in any of these microsites.

9:00 ACTIVITIES OF SALTICID SPIDERS ON A FENCE: A PRELIMINARY REPORT ON A SEARCH FOR NICHE SEPARATION. Kathleen G. Beal. Department of Biology, Capital University, Columbus, OH 43209.

The activities of three species of salticid spider (Salticus scenicus, Metaphiddipus protervus, Tutelina elegans) and an immature Metaphiddipus sp. (probably M. protervus) were observed on a chain link fence from 1 May to 30 July 1981. Salticus scenicus and the imm. Metaphiddipus sp. were observed most frequently. I quantified three aspects of spider activity: distance travelled/min, number of stops/min, and number of changes in orientation (90° or more)/min. Salticus scenicus and Tutelina elegans were longer than the imm. Metaphiddipus sp. S. scenicus covered more distance and stopped more frequently than the imm. Metaphiddipus sp. The presence of S. scenicus on fence segments was slightly negatively correlated to the presence of the other salticid groups, but the relationship was too weak to support spatial separation. Greater differences in the activity of these spiders is expected but not yet defined.

9:15 THE DEATH FEINT AND OTHER RESPONSES OF THE TERRESTRIAL ISOPOD PORCELLIO SCABER TO A JARRING STIMULUS. Gary D. Hals and Kathleen G. Beal. Department of Biology, Capital University, Columbus, OH 43209.

The terrestrial isopod Porcellio scaber responds to a jarring stimulus by running, turning upright/remaining motionless (except for antennae movement), or feigning death. We divided the crustaceans by sex and length into four classes: females/males less than 10 mm, and females/males greater than or equal to 10 mm. Individuals were maintained separately and tested 10 times each at 48 hr intervals by jarring their housing container with a controlled force. No differences were detected in the frequencies of the three responses between the sexes, but smaller isopods feigned death more frequently than larger ones. Small males used all three responses with equal frequency, but other classes responded most frequently by running, and least frequently by feigning death. Most individuals used all three responses. No relationship was detected between type of response and force of the stimulus.

9:30 HABITAT AND MOVEMENTS OF BREEDING YELLOW RAILS. Jeffrey R. Stenzel and Theodore A. Bookhout. Ohio Cooperative Wildlife Research Unit, The Ohio State University, Columbus, OH 43210

Habitat requirements and movements of radio-instrumented yellow rails (Coturnicops noveboracensis) were examined between 11 May 1980 and 30 August 1980. A 30.25 ha study area was established in the extensive wet sedge meadows of the Seney National Wildlife Refuge in the Upper Penninsula of Michigan. At least 6 singing males had most or all of their territories within the study area. Four pairs of breeding birds were fitted with radio-transmitters. The sedge meadow was 91% Carex lasiocarpa, a tall, mat-forming sedge. The stem density was 1400 stems/m^2. The mean total area used by males was 5.3-ha. Females just prior, and during incubation moved in an area less than 1-ha. Serial polygyny was exhibited by at least 1 male. The female monitored after hatching of the eggs stayed within the territory of her mate.

9:45 MATERNAL INFLUENCE ON ACQUIRING SOCIAL DOMINANCE IN YOUNG MALE HOUSE MICE. David W. Waller and Scott L. Corbett. Department of Biological Sciences, Kent State University, Kent, Ohio 44242

From sociobiological concepts, it may be deduced that in appropriate species, social dominance status of assisting parents should affect the initial status acquired by offspring. This hypothesis was studied in the feral house mouse (Mus musculus). Captive-born adult females were assigned to social dyads. Agonistic behavior observed was used to designate dominant and subordinant females in each dyad. After mating, the two females of each dyad were caged together and reared their combined litters communally. After weaning, each male offspring was caged independently until three months old. For each communal group, one son of the dominant mother and one son of the subordinant mother were identified as a male dyad, for observation of acquisition and expression of social status. During initial direct re-encounters of male dyads in neutral-arena-fight trials, the son of the dominant mother attacked the son of the subordinant mother decidedly more than vice-versa in 13 of 16 dyads. During later indirect re-encounters of male dyads in empty-cage-invasion trials, the high-attack male explored its partner's home-cage significantly more than the low-attack male explored its partner's home-cage. In this experiment, dominant mothers biased their sons' social status towards dominance. Genetic background would not easily explain this influence. The cause is proposed to be social interaction patterns among the mothers and offspring within each communal group.

RESPONSE OF CAPTIVE GEOFFROY'S TAMARINS (SAGUINUS GEOFFROYI: CALLITRICHIDAE) TO MATE ABSENCE. Carol A. Skinner, Dept. of Biological Sciences, Kent State University, Kent, OH. 44242

10:00

Geoffroy's Tamarins are small, New World primates which inhabit dense, low forests of Panama and Northern Colombia. They are monogamous and are commonly found in small social groups, believed to be nuclear families. Should separation of the mates occur, some means of reunion must be available to maintain the pair-bond. It was predicted that an increase in activity level and an increase in sounding vocalizations should occur during separations. Two captive-born pairs were observed from May, 1981, to November, 1981. Reciprocal separations of mates for varying time periods were conducted. With mate absence, the occurrence of resting, distance-directed search behavior, and sounding vocalizations all increased; concomitantly scent marking, hunting/foraging, eating and autogrooming all decreased. All these changes were dependent on the gender of the performer; females increased sounding more than males, whereas males increased resting and searching more than females. Total distances moved also increased by 25%, but with no gender difference. The increase in resting was unanticipated. The gender differences may be related to the roles of the male and female in maintenance of the pair-bond. Significant differences between pairs point to an element of individuality. The unknown histories of the subjects is a possible cause. Also, social influences between the two pairs might account for the pair differences observed. The cooperation of Cleveland Metroparks Zoo and Chicago Lincoln Park Zoo is gratefully acknowledged.

SMALL MAMMAL COMMUNITY STRUCTURE IN RECLAIMED AND UNRECLAIMED GRAVEL MINING AREAS Barbara A. Sweeney, Dept. of Biological Sciences, University of Cincinnati, 45221

10:15

The small mammal communities of reclaimed and unreclaimed gravel mining areas were sampled from July 1980 to August 1981. Isolated sites no longer actively used for mining were chosen in Warren and Clermont counties. Snap trapping was used initially to sample these communities. Data from these collections indicated that differences existed in both species composition and population structure between the two areas.

A more detailed study of Peromyscus leucopus in each area was conducted by the mark and recapture technique in 1981. Live trapping indicated the presence of an established Peromyscus population in the unreclaimed area and the absence of such a population in the reclaimed area. Vegetational sampling of each area was conducted using a quadrat method of sampling. Plant species diversity, percent cover/species, and such structural measurements as mat depth, percent cover, and stem density in each area were made. This analysis indicated differences in plant diversity and vegetational structure between the two communities which may help to explain the differential utilization of these habitats by Peromyscus.

LONG-TERM POPULATION TRENDS IN WHITE-FOOTED MICE (PEROMYSCUS LEUCOPUS).

10:30

Loisirene Blumberg and Stephen H. Vessey, Department of Biological Sciences, Bowling Green State University, Bowling Green, Ohio 43402.

The white-footed mouse, probably the most abundant small mammal in Ohio, is an excellent subject for population studies, being easily trapped and marked. An isolated two-hectare oak-hickory woodlot in Wood County, Ohio, has been intensively live-trapped for nine years. Population size estimates, based on the minimum number known alive, show annual cycles, with population peaks fluctuating more than six-fold among different years. Two general patterns emerge: in high population years (1973, 79, and 80) numbers peaked in the summer (July or August), then declined more than three-fold in late summer and early fall. In low population years (1975, 76, 77, and 78) numbers increased gradually through the spring and summer, peaking in fall (October or November). In July 1980 at least 230 mice were present, the highest density recorded anywhere for this species. A number of variables associated with climate and vegetation are being studied by means of multivariate statistics to help understand the factors that determine population size and the distribution of mice within the woodlot.

SOCIAL DOMINANCE IN **Microtus** pennsylvanicus POPULATIONS AS DETERMINED FROM A DOMINANCE INDEX. Jennifer Orme and Douglas H. Taylor. Dept. of Zoology, Miami University, Oxford, Ohio 45056

10:45

A dominance index was established for populations of meadow voles (Microtus pennsylvanicus) from urinary marking patterns. The marking patterns were collected in test boxes (1.0m^2) from animal populations kept in outdoor enclosures (0.1 ha). Data was collected from individuals trapped between June and October for two consecutive years. The dominance index for each vole was determined from the area, frequency, and total number of urine spots on a marking paper. The marking test was highly correlated with the

results from paired encounters. Locomotor activity tests further substantiated the social hierarchy established by the dominance index. The use of urinary marking patterns provides a relatively quick and accurate measure of dominance for a wild population as well as laboratory populations.

R. ECOLOGY

FIRST AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 265

1:30 BUSINESS MEETING

BENTHIC MACROINVERTEBRATES AS INDICES OF WATER QUALITY IN THE UPPER TUSCARAWAS RIVER. Susanne M. Hyland, Department of Biology, University of Akron, Akron, Ohio 44325.

2:00 During the summer of a survey of the benthic macroinvertebrate community utilizing six stations was conducted to determine the water quality of the upper Tuscarawas River in northern Stark and southern Summit Counties, Ohio. Two means of sampling were used: Hester-Dendy multiplate artificial substrate samplers and a modified shovel sampler.

Preliminary analysis indicates that the upper Tuscarawas River is a slightly to moderately damaged ecosystem. The surrounding deforested watershed is devoted mainly to agriculture with increasing encroachment of housing developments. Site One, the farthest upstream, and Site Six, immediately below a dam, both had water flow which was extremely reduced and sluggish and had communities dominated by pollution-tolerant organisms such as representatives from the class Oligochaeta and the Diptera families Chironomidae and Simuliidae. At the three other sites situated immediately below dams the communities were dominated by the caddisfly Cheumatopsyche sp. The cleanest station, Site Four, is located less than one mile downstream from a sewage treatment plant and had a substantial variety of clean water organisms including the stonefly Paragnetina sp.

DISTRIBUTION AND OCCURRENCE OF BENTHIC MACROINVERTEBRATES IN THE BUCK CREEK WATERSHED. Daland R. Juberg and Peter B. Vila. Department of Biology, Wittenberg University, P.O. Box 720, Springfield, Ohio, 45501.

2:15 To determine the distribution and relative abundance of benthic macroinvertebrates in the Buck Creek Watershed, we sampled the major tributaries and the main stream of Buck Creek (Champaign and Clark Counties, Ohio). We selected 13 sites, believed to represent various micro-habitats in the drainage system, during the Fall, 1981.

Physical data obtained included; discharge, velocity, and substrate composition. We also considered the influence of local conditions upon the benthic fauna. Biologic data involved both qualitative and quantitative distribution of benthic macroinvertebrates, determined by a Surber Stream-Bottom Sampler.

Our analyses focused on both the diversity and density of species, and proportional abundances of functional groups (collector-filterers, collector-gatherers, shredders, scrapers, and predators). Both single factor analysis of variance and trend analysis showed significant differences in species density between the upper (stations 1-6) and lower (stations 7-13) parts of the watershed ($p<0.05$). There was also a systematic decrease in biomass from station 1 to station 13. Throughout the watershed, there were no significant differences in species diversity, and the major faunal components at each site were ubiquitous. Because substrate composition and velocity values were relatively consistent throughout, we propose that in the Buck Creek Watershed, local conditions strongly influence the relative abundance (biomass) of benthic macroinvertebrates.

MEIOBENTHIC BIOMONITORING OF THE LAKE HOPE MINE DRAINAGE ABATEMENT PROJECT: AFTER TWO YEARS. William D. Hummon, Department of Zoology, Ohio University, Athens 45701.

2:30 Construction work on the abatement project was completed in December, 1979. The ultimate aim was to reduce acid runoff from Big Four Creek (BF) into Sandy Run (SD) and Lake Hope by 40%. My objective is to monitor the recovery and to determine its extent and its time-frame. Hence, two sites in each of these streams are being compared with each other and with two sites in Strouds Run (ST), an unpolluted control stream, during June and late October-early November of each year. Physical, chemical and biological

parameters are being monitored, with efforts concentrated on sand-dwelling micrometazoans. Results from the first year following completion of construction were reported in Ohio J. Sci. 81 Suppl.: 103. All six study sites were subject to periodic flooding throughout Spring 1981 and then to prolonged drouth during Summer and Fall 1981. Within the drouth period streamflow at all six sites was minimal (1-7 dm^3/sec), while total conductivity at the most polluted sites (BF lower, SD upper) was maximal (2100-2700 µmho/cm, 25°C); it appears that at least half the stream water in BF was derived from acidic groundwater or leakage from sealed drift mines. Previously, during the periodic Spring flooding, sediment transport and deposition at BF lower was sufficient to require removal by a backhoe from the area above a USGS gauging station, and at ST west currentflow had removed my study site by erosion. Taxa and numbers of meiofauna were reduced in June 81 relative to June 80 but were increased in Nov. 81 relative to both Oct. 80 and June 81, confirming the important influence of weather conditions on the system. Relations between sites were unchanged from those reported last year, showing no recovery in BF.

2:45 INVERTEBRATE AND PLANT PIGMENT CHANGES DURING STRIP MINE LAKE RECOVERY: A PALEOLIMNOLOGICAL INVESTIGATION. A. Warner and R.E. Carlson. Department of Biological Sciences, Kent State University, Kent, Ohio 44242.

A sediment core taken from a fully-recovered acid strip mine lake was used to investigate changes in the biological community during lake recovery. Cladoceran remains, dipteran head capsules, and sedimentary pigments were examined at 1 cm intervals in the 30 cm core. The zooplankter, Chydorus sphaericus was the first invertebrate encountered in the core (16 cm) and it remained the dominant species throughout. Other invertebrates (Kurzia, Alona, Pleuroxus, Bosmina, Daphnia, and Chaoborus) became abundant above 8 cm. Chlorophyll pigments also began to increase at 8 cm. The upper 8 cm of the core appear to represent a period of intense biological community development and may represent the time of rapid change in pH of the lake water.

3:00 THE EFFECT OF ALTERNATIVE PREY ON THE CONSUMPTION OF MOSQUITO LARVAE BY NOTONECTIDS. Jean Chesson, Battelle, Columbus Laboratories, 505 King Avenue, Columbus, Ohio 43201.

Members of the aquatic insect family Notonectidae are voracious predators on mosquito larvae and have been suggested as potential biological control agents for this pest. However notonectids prey on a wide range of other organisms in addition to mosquitoes and previously it was not known how the presence of alternative prey might affect the number of mosquito larvae consumed. Experiments were carried out with two types of alternative prey: the zooplankter Daphnia pulex and Drosophila (representing terrestrial prey trapped on the water surface). The presence of Daphnia caused very little reduction in the number of mosquito larvae eaten despite the fact that in some cases Daphnia were preferred relative to mosquito larvae. In contrast, the presence of Drosophila resulted in a large decrease in the predator's mosquito consumption. The difference between the effects of these two alternative prey was explained in terms of preferences, searching times, handling times and capture rates.

3:15 FACTORS AFFECTING COLONIZATION OF EXPERIMENTAL PONDS BY CHIRONOMIDAE (DIPTERA) Donna Francis Dept. of Biological Sciences, University of Cincinnati, Cincinnati, Ohio 45221. Chironomid larvae are a major component of the macroinvertebrate community in freshwater systems and are an important food source for fish and birds. Chironomid distributions in gravel pit ponds of the Little Miami River valley seem to be affected by such factors as bottom substrate, bottom oxygen, and pond productivity. An experiment designed to test the effects of substrate and productivity consisted of twelve artificial ponds with three different substrate types, set up near the Little Miami River in May-June and August-September of 1981. Substrates used were clay, gravel, and mud. Six of the twelve ponds were fertilized weekly and chemical parameters of each pond were monitored weekly. After approximately eight weeks, three bottom samples and two Hester-Dendy samplers were removed from each pond and samples sorted to remove chironomids. The larvae were mounted on slides and identified to species. Ponds with clay substrate appear to have the lowest number of individuals per pond. Data were analyzed using 2-way analysis of variance and ordination. Communities appear to be composed of some species common under all conditions and other species restricted to one or a few treatment types.

3:30 CRANE FLIES OF MENTOR MARSH (DIPTERA: TIPULIDAE). Michael J. Bolton, Department of Biology, The University of Akron, Akron, OH 44325

A Dipteran survey of Mentor Marsh, Lake County, Ohio was conducted during the months of June, July, and August of 1981. Insects were collected with emergent traps, sticky traps, soapy-water pan traps, and insect sweep nets. Forty-four species of crane flies were collected from the marsh and adjacent woodlands. Among the marsh inhabiting species

the most numerous were Helius flavipes, Pseudolimnophila luteipennis, Pilaria tenuipes, and Erioptera caloptera. The following species collected are unrecorded for Ohio: Tipula illustris, Tipula kennicotti, Limonia immatura, Limonia globithorax, Helius mainensis, Pseudolimnophila noveboracensis, Pilaria osborni, Gonomyia cognatella, Erioptera pilipes, Erioptera furcifer, and Toxorhina magna.

3:45 SEASONAL EFFECT OF BODY SIZE AND TEMPERATURE ON RESPIRATION OF THE FRESHWATER CLAM, MUSCULIUM LACUSTRE. Jeffrey P. Alexander and Albert J. Burky. Department of Biology, University of Dayton, Dayton OH 45469.

Oxygen consumption of field acclimated clams was experimentally measured at 10°C, 20°C and field temperatures on the day of collection (assessed by Winkler titration). $M = aW^b$, where $M = \mu l O_2$ $clam^{-1}$ hr^{-1}, W = average ash-free dry weight (AFDW) per clam, and a & b are constants. Dates and field temperatures (°C) are identified: mid-May (15°), mid-June (24°), mid-July (28°), late August (24°) and mid-November (10°). At 10°, 20° and field temperature the b value constants are 0.73, 0.57, 0.63; 1.34, 1.08, 0.95; 0.72, 0.66, 0.44; 0.98, 0.92, 1.13 and 0.75, 0.58, 0.75 for each date and temperature respectively.

When b = 1 clams of all body size have the same oxygen consumption per unit weight; when b <1 smaller clams have a higher rate. For most dates there is an inverse relationship between b value and experimental temperature suggesting that smaller clams are more opportunistic as temperature increases —— facilitating elevated levels of respiration, feeding, growth etc. Seasonally b values are lowest in the summer with elevated values at times of reproduction (June and August-October when b at field temperature is essentially 1.0). Higher b values probably represent the presence of many small embryos in the broods of these hermaphroditic and viviparous clams.

Supported by grants from the Ohio Biological Survey and the University of Dayton Research Council.

4:00 ROCK SUBSTRATE AVAILABILITY AS A FACTOR LIMITING THE POPULATION DENSITY OF DESMOGNATHUS QUADRAMACULATUS SALAMANDERS. Robert D. Davic and Lowell P. Orr. Department of Biological Sciences, Kent State University, Kent, Ohio 44242.

An in situ experiment was conducted in a second order stream located in Macon County, North Carolina to determine whether or not the population density of Desmognathus quadramaculatus salamanders is associated with available stream-bed rock substrate. Artifical stream plots were created at three levels of substrate density and two levels of salamander density. Results of the experiment indicate a significant positive non-linear correlation between the two factors (r^2=0.84). Results also verify previous data that the species is at carrying capacity within the stream under investigation. Observational estimates of salamander and rock abundances are compared to the experimentally derived relationship and the goodness-of-fit between the two reported. We hypothesize for future experimental verification that the existence of a positive association between available rock substrate and salamander density would be adaptive due to: (1) increased refugia for salamanders from potential vertebrate predators, and (2) increased rock surface area for colonization by benthic macroinvertebrates utilized by the salamanders as food.

4:15 PREDATION BY WALLEYE (STIZOSTEDION VITREUM) AND YELLOW PERCH (PERCA FLAVESCENS) ON FORAGE FISHES IN WESTERN LAKE ERIE. Roger L. Knight, F. Joseph Margraf, Robert F. Carline. Ohio Coop. Fishery Res. Unit, Ohio State University, Columbus, OH 43210.

In this study, we documented the food habits of adult walleye (Stizostedion vitreum) and yellow perch (Perca flavescens) and related diet selection to forage fish availability. Two offshore stations in the Western Basin of Lake Erie were sampled over a 3-year period with bottom trawls and gillnets. We removed stomachs from about 500 walleyes and 1,200 yellow perch, analyzed their contents, and compared these data to the size distribution and relative abundance of their primary prey.

Walleye were more piscivorous than yellow perch and did not switch to invertebrates when forage fish abundances were low. Yellow perch were omnivorous and readily converted to an invertebrate diet when forage fishes were less available. Walleye ate yearling shiners (Notropis spp.) in spring and early summer, then shifted to gizzard shad (Dorosoma cepedianum), alewife (Alosa pseudoharengus), and other abundant young-of-year fishes in late summer and early fall. Walleye switched back to shiners in late fall because other fishes were too large. Piscivorous yellow perch preferred similar food to walleye but were cannibalistic in some instances. Walleye seldom selected prey greater than 40% of their total length whereas yellow perch occasionally ingested prey more than 50% of their length. Walleye and yellow perch were opportunistic feeders with relative abundance of prey largely determining diet selection. In western Lake Erie, abundance of forage fishes probably influence walleye and yellow perch growth rates.

BIOCHEMICAL AND ELECTROPHORETIC MONITORING OF SERUM PROTEIN AND ENZYMATIC ABERRATIONS IN BLUE GILLS-LEPOMIS MACROCHIRUS, CHALLENGED BY VARIOUS DOSES OF METHYL MERCURY CHLORIDE. Hiran M. Dutta, S. B. Lall, A. Zendedel Haghighi.
4:30 Department of Biological Sciences, Kent State University, Kent, Ohio 44242.

Methyl mercury chloride is one of the dreaded pollutants of the aquatic environment. Its incorporation in the body via various routes is known to cause tissue necrosis and dearrangement of homeokinetic equilibrium of the organ and body functions. In the present study blue gills, Lepomis macrochirus, were used as a model, to study the serum proteins and enzymatic alterations in response to increasing concentrations of methyl mercury chloride. Groups of fishes (3-5) with appropriate controls were exposed to $5x10^{-7}$M., and $5x10^{-6}$M. and $5x10^{-5}$M. of test chemicals while low concentrations ($3.476x10^{-12}$) did not induce abnormal swimming behavior, rapid ventilation, etc. At higher doses ($5x10^{-4}$M.) the animals begin to swim in a disoriented manner as manifested by sideways movement, finally culminating into a characteristic belly up posture. The other features were rapid opercular movements. Death ensued within 6-18 hrs. Serum of such animals was subjected to enzyme and protein assay using biochemical, cellulose-acetate, and polyacrylamide disc gel electrophoresis. Lactate dehydrogenase, malate dehydrogenase and succinic dehydrogenase activity showed considerable variation in challenged and control animals. Total protein and protein banding patterns also displayed marked variations. The differences were noticed with respect to dose and time as well. These perturbations in serum proteins and enzymes are suggested to be due to cellular and tissue necrosis and are probably related to profound metabolic alterations in organ physiology.

THE ROLE OF FISH COMMUNITY STRUCTURE IN ASSESSING WATER QUALITY IN OHIO'S RIVERS AND STREAMS. Chris O. Yoder, Division of Surveillance and Standards, State of Ohio
4:45 Environmental Protection Agency, Columbus, Ohio 43215.

Since 1977 the Ohio EPA has conducted an annual program of biological and water quality surveys of Ohio's rivers and streams for the purpose of evaluating water pollution abatement programs. During this period relative abundance determinations of the fish community have been made over approximately 1000 miles of rivers and streams in 10 of the 23 major watersheds of the state. Indices most commonly used to assess longitudinal changes in river and stream fish communities are the composite index, number of species, similarity coefficients, and percent composition. Results obtained during the past five years have revealed the following; 1) the severity of degradation of the fish community was directly related to the magnitude and frequency of pollutional loadings, 2) water quality perturbations tended to cancel out the diversity enhancing characteristics of streams, 3) community recovery was repeatedly interrupted in rivers receiving loadings from multiple sources, and 4) water quality evaluations based on biological results often times revealed perturbation whereas evaluations based on chemical/physical data alone indicated satisfactory conditions. Most of the negative effects observed resulted from changes in water quality which were attributable to point sources of wastewater. In a few instances nonpoint sources had equally severe, but highly localized negative effects.

R. ECOLOGY

SECOND AFTERNOON SESSION, SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 268

1:30 BUSINESS MEETING, DENNEY HALL 265

ECOLOGICAL TIME LAGS OF SOLAR CYCLE EFFECTS IN THE TROPHIC PYRAMID John F. Wing, Department of Psychology, Wittenberg University, Springfield, Ohio 45501

2:00 King (1976) reports that temperature and, possibly, rainfall are optimal in England at about sunspot maximum, which is also the time of longest growing season (Gloyne, 1973). Indeed, at Wytham, England, Varley and Gradwell's (1963) data show that larval density of Operophtera brumata also peaks at or just prior to sunspot maximum ($r = .47$, $p < .05$) which is also a peak time for beechmast, as well. Lack's (1966) data on Parus major and P. caeruleus (which adjust fledgling hatch-times to O. brumata's half-fall) show that breeding pairs increase every year after sunspot maximum, reaching a peak at lag +3, thus yielding solar-population cycle correlations of $r = .57$ ($p < .01$) and $r = .53$ ($p < .02$), respectively, at that lag. (These breeding peaks coincide, of course, with peaks in total mortality (K) and winter disappearance (K_1) for O. brumata.) More limited data on P. major at Forest of Dean and P. ater (inhabiting Pinus sylvestris and P. nigra) at Breckland show

consistent but slightly shorter lags, respectively: r = .47 ($p < .05$ at lag +1); r = .43 ($p < .10$ at lag +1); and r = .72 ($p < .02$ at lag 0). Confirming data from several other food webs are also described. Such correlations suggest a reverberation of the solar cycle through the trophic pyramid with sensible, ecological time lags.

2:15 ON THE PREDICTABILITY OF REVERSALS IN SOLAR-TERRESTRIAL CORRELATIONS John F. Wing, Department of Psychology, Wittenberg University, Springfield, Ohio 45501

The most damaging evidence against the solar theory of weather, plant, and animal oscillations is the periodic breakdown and even reversal in solar-terrestrial correlations. This study shows that the major breakdowns and reversals in terrestrial phenomena occurred at the Gleissburg solar minima of 1798-1832 (solar cycles 5, 6, 7) and the 1867-1900 (solar cycles 11, 12, 13) when the solar wind was weak, the auroral oval shrank, and the typical Hale (1908, 1925) cycle of alternating polarity was disrupted by two, successive negative cycles. Since Willet (1976) already has shown significant differences in temperature for positive and negative solar cycles, a disruption or reversal in weather/plant/animal oscillations might be expected at the Gleissburg minima. Such reversals are evident in Thomas' (1941) 180-year record of Swedish harvests; in Schwerdtfeger's (1941, 1950) 60-year record of German forest moths (Dendrolimus pini, Panolis griseovariegata, hyloicus pinastri, and Bupalus piniarius); in Elton and Nicholson's (1942) 165-year record of Lynx canadensis; and in Shelford and Flint's (1943) 120-year record of Blissus lerecopterus. These classic population data show that even the exceptions prove the rule: namely, the breakdowns and reversals in solar-terrestrial correlations are due to solar events themselves.

2:30 ECOSYSTEM LINEARIZATION: A RESULT OF RESOURCE LIMITATION. Robert F. Gaugush. Department of Biological Sciences, Kent State University, Kent, OH 44242.

The hypothesis that ecosystems linearize as a result of resource limitation was examined with the use of neutral models and flow-through microcosms. A linear behavior was defined as a behavior which held to the principle of superposition. Neutral models are computer-generated compartmental systems where the nature of the compartments and the flows between them are assigned without making ecological assumptions about the compartments or their interactions. Nonlinear neutral models tend to become linear in their behavior or linearize when resource limited. Flow-through microcosms were used to examine the possibility of the linearization of living systems. A set of microcosms formed a 4x3 matrix with 3 initial PO4-P levels and 4 initial NO3-N levels resulting in 12 N:P atomic ratios ranging from .075 to 300. Previous work had shown that microcosms with N:P < 15 are N-limited and those with N:P > 30 are P-limited. In the N-limited microcosms phosphate-P displayed a nonlinear behavior but nitrate-N was linear and the reverse was observed in P-limited microcosms.

2:45 ACTIVITIES OF ALPHA-EMMITTING URANIUM AND THORIUM ISOTOPES IN ANTARCTIC COAL. Gareth E. Gilbert. Department of Botany, The Ohio State University, 1735 Neil Avenue, Columbus, OH 43210.

Five Antarctic coal samples from four widely separated localities were analyzed for alpha-emitting isotopes of uranium and thorium to obtain a greater understanding of the concentrations of primordial radionuclides of geological materials in general and the concentrations of alpha-emitting nuclides in Antarctic coal in particular. We were also interested in ascertaining whether or not the mean concentrations of these radionuclides in Antarctic coal were markedly different than the reported mean concentrations of North American coal.

The analysis revealed that the concentrations of uranium-238 and -234 and thorium-230 are essentially equal; therefore, it is inferred that these nuclides are in secular equilibrium. However, the concentrations of these nuclides varied by about an order of magnitude between the study areas. In general, these results also held for thorium-232 and -228.

The results further revealed that the mean concentrations of the uranium and thorium radionuclides in Antarctic and North American coal are essentially equal.

3:00 RADIOACTIVITY OF ISOTOPES OF LEAD, POLONIUM, URANIUM AND THORIUM IN THE LUNGS OF COAL MINERS OF APPALACHIA AND THE LUNGS AND LIVERS OF INDIVIDUALS OF THE GENERAL POPULATION OF CENTRAL OHIO. Gareth E. Gilbert. Department of Botany, The Ohio State University, 1735 Neil Avenue, Columbus, OH 43210.

Twelve lung and three liver samples of 12 deceased individuals of the general population of central Ohio and lung samples of four deceased coal miners of Appalachia were

analyzed for lead-210, polonium-210, uranium-238 and -234 and thorium-232, -230, and -228. Approximately 20 tentative inferences regarding the distribution of these radionuclides between the lungs and livers of individuals of central Ohio and between the lungs of individuals of central Ohio and coal miners of Appalachia have been made and will be presented.

USING ORGANISMS AS EARLY WARNING SYSTEMS TO PROTECT HUMAN HEALTH. B. W. Cornaby, G. J. Mihlan and S. E. Pomeroy. Battelle, Columbus Laboratories, 505 King Avenue, Columbus, Ohio 43201.

3:15

Traditionally, early warning systems to protect human health from environmental carcinogens and toxicants have consisted of laboratory biological tests, clinical trials, and occasionally environmental models such as the canary in the mine. A field or ecologically-oriented approach is needed to supplement the elaborate laboratory and clinical approaches to estimations of risk. Criteria for recognizing non-human/human dyads will be discussed relying on such factors as a) varying responses of different species to the same toxicant, b) differing responses as a function of exposure, and c) appropriateness of the dyad. We will present dyads such as lichen mortality/human bronchitis and small vertebrate morbidity/human chloracne as evidence of the viability of this concept.

USE OF MAMMALS TO PREDICT ENVIRONMENTAL CONSEQUENCES OF A VENEZUELAN POWER PLANT. B. W. Cornaby, K. M. Duke, S. E. Pomeroy, Bioenvironmental Sciences Section, Battelle, Columbus Laboratories, Columbus, Ohio 43201 and F. Gomez, S. Barreva,

3:30 and A. Eihegarreta, INELMECA, Caracas, Venezuela.

The relative abundance and distribution of mammals, especially marsupials, rabbits and sheep, were systematically examined in five habitats in a northern coastal ecosystem in Venezuela. Concentrations of toxic heavy metals (Cr, Cu, Pb, Ni, V), expected to be in the exhaust gases from a nearby fossil-fuel burning power plant under construction, were measured in soil, plant tissue, and in heart, liver, and kidney of mammals. Some of these environmental components exhibited elevated metal concentrations prior to operation of the power facility. Predictions of changes in relative abundance and distribution of mammals and changes in concentrations of heavy metals in organs suggested the need for air pollution control. Also, the mammal species, organ, and metal best suited for future monitoring of the success of the control measures were identified.

CONSERVATION IN AND OUT OF NATURE PRESERVES. Reed F. Noss, Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Fountain Square,

3:45 Columbus, Ohio 43224.

Land management as an applied strategy for biological conservation is a new and imperfect science. Land has been managed for immediate human benefits for millenia; we must now take a broader approach in terms of both time and space if we are to perpetuate whole ecosystems. Preservation of viable communities of indigenous organisms is a primary objective in nature preserve design and management. To accomplish preservation, a managing agency needs to consider what goes on between and around the units in the system, not just inside them. Managers of parks and preserves are often interested in maintaining maximum habitat diversity within a unit, perhaps at the expense of the species and communities most in need of protection. These critical elements are best considered within a regional biogeographic framework. Natural Heritage Program data can be used to identify elements in a region most in need of protection. Management strategy should emphasize long-term maintenance of regional diversity, with particular attention to extinction-prone species, rather than high diversity within a particular preserve. Examples of regional landscape considerations and endangered communities in Ohio are discussed.

A COST/BENEFIT APPROACH TO PREDATOR/PREY INTERACTIONS IN VARICUS MOONLIGHT INTENSITIES. Jennifer A. Clarke, Dept. of Zoology, Miami Univ., Oxford OH 45056

4:00 Numerous nocturnal prey species increase activity on extremely dark nights and decrease activity on relatively bright nights. The etiology of these activity strategies can be analyzed in terms of costs and benefits to the prey species. In this study the activity of deermice (Peromyscus maniculatus) was measured under three simulated moonlight intensities designated new, quarter, and full moonlight in a laboratory situation. As expected from observations of wild populations, the deermice significantly reduced activity in bright moonlight. In the succeeding phase of the study,the deermice were exposed to predation by short-eared owls (Asio flammeus) in each moonlight intensity. The owls' hunting efficiency, and deermouse vulnerability, increased with nocturnal illumination as determined by the time required by the owls to capture the mice.

These results indicate that when darkness is abundant, as on new-moon nights, the benefits of activity, i.e. locating food and mates, exceed the costs of activity, i.e. vulnerability to visually oriented predators. When darkness is rare, as on full-moon nights, the benefits of inactivity, i.e. reduced vulnerability to visually oriented predators, exceed the costs of inactivity, i.e. reduced foraging and mating. Hence, a major factor influencing the strategy adopted by deermice in their activity patterns is predator pressure associated with nocturnal illumination.

INVESTIGATIONS INTO THE ROLE OF MYCORRHIZAE ON PINE SEEDLING SURVIVAL ON STRIP-MINED LANDS. Frederick A. Miller; Department of Botany, The Ohio State University; 1735 Neil Avenue, Columbus, Ohio 43210.

4:15

Pine seedlings which have had their roots inoculated with the fungus Pisolithus tinctorius, forming ectomycorrhizae, are reported to exhibit better survival on strip-mine lands than non-inoculated seedlings. One possible mechanism for improved seedling survivorship may be the immobilization or accumulation of toxic heavy metals by the fungus associated with the seedling's roots. Scanning electron microscopy coupled with x-ray micro-analysis was used to locate heavy metals inside and on surfaces of roots. Both inoculated and non-inoculated roots were examined. Some elements show different concentrations in mycorrhizal versus non-mycorrhizal roots, thus indicating presence or abscence of mycorrhizae can affect uptake of some metals.

FORAGING BEHAVIOR IN THE EASTERN CHIPMUNK (TAMIAS STRIATUS) AS RELATED TO THE MARGINAL VALUE THEOREM Greg A. Anthony and David W. Waller, Dept. of Biological Sciences, Kent State University, Kent OH 44242

4:30

The marginal value theorem states that a predator should leave a patch, regardless of its dispersion type, when its capture rate falls below the expected average prey density for that habitat. Foraging episodes of four randomly selected adult chipmunks were observed between August and November, 1981. Patches were positioned within artifical foraging arenas, 1.22 x 1.83 m. in size. Four dispersion patterns were used in both one and two dimensional arrays. The overall arena density was kept constant. The tendency to leave a patch, indicated by seeds left per patch, declined with increasing patch size. This tendency to leave was not significantly different for comparable patch sizes in one and two dimensional arrays. Overall, in both one and two dimensional arrays, search time declined with an increase in seeds per patch. "Two dimensional" search time was coincident with one dimensional given the same patch size. This greater tendency to leave at low patch density independent of the dispersion pattern conforms to the marginal value theorem. The decreased search time with increasing patch richness may indicate correlation to expected patch richness. "Two dimensional" search time being coincident with one dimension may indicate more efficient foraging at the two dimensional level. This suggests an evolved adaptation to encountering more widely spaced patches.

PREDATOR AVOIDANCE BY GYRINID BEETLES Kevina Vulinec, University of Cincinnati, Cincinnati, Ohio 45221

4:45

Gyrinid beetles aggregate in large flotillas on the water surface of ponds and lakes for purposes other than mating, most probably defense from predation. Proposed hypotheses for the mechanism which allows predator avoidance include: advertisement of toxicity, the additive effect of individual environmental scanning, and increased arousal of individuals due to frequent bodily encounters. Field and laboratory experiments indicate that the rapidity of avoidance behavior in groups of Gyrinids is a function of group size and that blinded beetles are slower to react to a predator model than are non-blinded beetles. These data tend to support the hypothesis of individual scanning.

S. INFORMATION AND LIBRARY SCIENCE

AFTERNOON SESSION, SATURDAY APRIL 24, 1982

ELIZABETH SAWYERS, PRESIDING

1:30 BUSINESS MEETING, DENNEY HALL 268

2:00 DEMONSTRATION OF LIBRARY CONTROL SYSTEM.

ROOM 222 MAIN LIBR. The Ohio State University Libraries has had an on-line circulation system for more than ten years. This Library Control System (LCS) was augmented with full bibliographic information in 1978, and the capability to search by subject was implemented at that time. During the current year authority control and cross references are being added to the system; the addition of these capabilities will allow the closing of the card catalog before year's end. Section S: Information and Library Sciences will take advantage of the location of this year's meeting and build its program around demonstration of

this pioneer library system, and discussion with key staff members involved in its development and use. This program is scheduled from 2:00 p.m. to 4:00 p.m. on Saturday, April 24; interested individuals should report to Room 122 in the Main University Library. There will be a formal presentation at 2:00 p.m. followed by demonstrations of the systems capabilities. Attendees will also be able to use the system directly on terminals which are available for public use.

POSTER SESSIONS

SATURDAY APRIL 24, 1982

DENNEY HALL ROOM 256

BOARD A @ 9:00

DEVELOPMENTAL CHANGES IN THE MOUSE AMNION: AN SEM STUDY. Jane N. Scott, Paula B. Pendergrass and Larry J. Ream. Department of Anatomy, Wright State University, School of Medicine, Dayton, Ohio 45435.

In the mouse, the amnion is a barrier between fluid contained in the amnionic and exocoelomic cavities. Although there is considerable interest in the role of fetal membranes in non-placental transfer, most studies with rodents have focused on the yolk sac. Since there is a paucity of morphologic studies on the mouse amnion, we have examined the amnionic and exocoelomic surfaces at different stages of gestation. Animals were sacrificed at 13, 16 and 18 days of gestation and at term. Uteri were opened and placentas with attached fetal membranes were removed and processed for scanning electron microscopy. At 13 days the exocoelomic surface is covered by flattened fibroblasts which have an epithelial appearance or fine, coiled fibers. There appears to be an accumulation of fibers throughout gestation so that by 21 days the cells are obscured by thick fibers which are arranged in a woven pattern. At 13 days the surface lining the amnionic cavity is characterized by squamous epithelial cells with sparse irregular patches of short microvilli. There is an apparent increase in microvilli so that by 16 days the cells are covered by these surface specializations. At 18 days and at term, some cells resemble those seen at 13 days; however, many cells are covered by microfolds. These observations suggest the amnion functions primarily to protect the developing fetus by forming a sac reinforced by a fibrous coat. The inner layer may function in absorption during gestation.

BOARD B @ 9:00

THE ROLE OF TERRITORIAL STRESS IN CONDITIONED OVEREATING IN DOGS. P. Pendergrass, L. Ream, M. Bartley, F. Nagy and R. Stuhlman. Departments of Anatomy and Laboratory Animal Resources, Wright State University, School of Medicine, Dayton, Ohio 45435.

Overeating is not normal canine behavior: however, it can be conditioned as evidenced by the large number of obese dogs kept as housepets. The purpose of our study was to determine the effect of territorial stress on conditioned overeating in mongrel dogs. Sixteen dogs (8 males and 8 females) were divided into 4 groups: Control (C), Control Reinforced (CR), Stressed (S), Stressed Reinforced (SR). Dogs were housed 2 per run and given dry chow and water ad libitum. SR dogs were offered a can of dog food twice daily while in the presence of nonreinforced dogs. CR dogs were removed to an isolated area and offered a can of dog food twice daily. Weights plus chest and abdominal circumferences were recorded weekly for 13 wks and expressed as average % gain. Weights in air and in water were used to calculate % body fat after 13 wks. Per cent weight gains for the groups were: C=17.6%; CR=20.3% S=7.6%; SR=14.7%. Reinforced dogs gained more than their nonreinforced run mates regardless of the feeding regimen. Moreover both C and CR groups gained more than either S or SR groups, with S gaining the least. Circumferential measurements correlated with weight gains in C and CR groups, but not in S and SR groups. Per cent body fat averages for the groups were: C=35.7%; CR=34.2%; S=24.0%; SR=23.9%. The ratio of % body fat for C + CR/S + SR was 1.46. These findings suggest that territorial stress is an effective factor in reducing net weight gain in dogs even when stressed dogs are reinforced to promote overeating.

Supported by NIH Biomed. Res. Grant 4334HO and Departments of Anatomy and Lab Animal Resources.

BOARD C
@
9:00

STUDIES ON A TUMOR-ASSOCIATED PLASMA FACTOR. Dorothy E. Schumm, Department of Physiological Chemistry, The Ohio State University, Columbus, Ohio, 43210.

Treatment of rats with the hepatocarcinogens, dimethylnitrosamine or thioacetamide, caused the release into the circulation of a protein factor capable of altering genetic expression in the liver both in vivo and in vitro. The factor could be detected 18 days after carcinogen administration even under conditions in which tumors are not apparent until 6 to 9 months. Administration of a non-carcinogenic dose produced only a very small increase in the factor. A similar factor appeared in the circulation of animals bearing transplantable hepatomas and sarcomas and dimethylbenzanthracene-induced primary mammary tumors. Removal of a tumor caused a prompt disappearance of the factor. Activity was also found in the plasma of midpregnancy and new born rats but not in lactating females. It was found in the culture media in which human cancer cells were grown. Human cancer patients also displayed a similar activity in their plasma. Tests of over 60 patients have shown that the factor occurs over a wide range of malignancies and may serve as a short term tumor detection test. Studies are underway to correlate the amount of factor with clinical diagnosis, sex, age, extent of disease, and other factors.

BOARD D
@
9:00

THEORIES OF FAMILIAL VIOLENCE: A REVIEW OF THE LITERATURE
Linda M. Harris and Cynthia S. Shellhaas
Box 140 Olson Hall Kent, Ohio 44243

To what extent are the major theories of familial violence currently employed in medical practice verified by adequate research methodology? To examine this issue, 110 articles, both actual studies and those theoretical in nature, were analyzed and rated according to specially adapted scales. The aforementioned articles dealt with verbal, emotional, and physical abuse and neglect with regard to the child, spouse, sibling or geriatric as the abused individual.

After completion of analysis, sixteen basic theories were obtained; six of these theories were substantiated with adequate research methodology and supports; six were questionably substantiated; and four were unsubstantiated-- yet, all of these theories are currently employed in professional practice.

The following theories were found to be well-substantiated: cycle of violence, stress, cultural norms, mother-child bonding, culture of violence, and isolation.

The theories in the unsubstantiated and questionable categories are not necessarily incorrect theories, but merely unproven. The theories of crisis, poor self-concept, ignorance frustration-aggression, intimacy, and socioeconomic levels are questionably substantiated; while those of immaturity, alcohol and drugs, the special child, and emotional-psychological are unsubstantiated. Therefore, it is our opinion that further research is mandated in regards to all types of abuse, and, more importantly, that these results must be cotabulated.

BOARD E
@
9:00

EFFECT OF LEAD ON PORPHYRIN METABOLISM. J. L. Baumann and M. Kreimer-Birnbaum, Research Dept. & Porphyrin Lab, St. Vincent Hospital and Medical Center, Toledo, OH 43608.

δ-aminolevulinate dehydrase (ALA-D, EC 4.2.1.24) is the second step in the porphyrin biosynthetic pathway, and one of the most sensitive points of lead inhibition. In Europe, the assay of ALA-D activity by a standardized method has been accepted by most laboratories (Berlin and Schaller, J. Clin. Chem. Clin. Biochem. 12: 389, 1974); but no such uniformity has been achieved in this country. We have reinvestigated several of the protocols in use in the USA and Canada. With 50 µl of whole blood at 37°C, ALA-D activity increased linearly up to 60 min. The apparent pH optimum was found at 6.60 ± 0.02 in 0.3M Phosphate-Citrate buffer. Secondary peaks of some 95% activity have consistently been observed at pH 6.40 and 6.80. The effect of substrate concentration on ALA-D activity depicts Michaelis-Menten kinetics, with Vmax obtained at substrate concentrations > 10.0 mM in the incubation mixture. Substrate inhibition was observed at ALA concentrations > 19.0 mM. The apparent Km of .278 mM is in close agreement with values reported by others with the purified enzyme. With these revised parameters, a control range for adults (lead levels < 11 µg/dl whole blood) was determined: Mean ± S.D. = 2177 ± 214 (range 1921-2628) units = nmoles porphobilinogen/ml rbc/hr. Patients with lead poisoning showed levels of ALA-D of about 40-50% below the control range. The usefulness of the ALA-D assay in lead poisoning studies, when the screening procedures may be inconclusive and/or in follow-up therapy, is illustrated. (Supported in part by grant #80-007 from the F. M. Douglass Foundation, Toledo, OH)

BOARD A @ 10:00

A DISSOLUTION STUDY OF ALUMINO-CALCIUM-PHOSPHOROUS OXIDE (ALCAP) CERAMICS. D.R. Mattie, S.N. Khot, C.J. Ritter, and P.K. Bajpai. University of Dayton, Dayton, Ohio 45469.

Cylinderical aluminum-calcium-phosphorous oxide (ALCAP) ceramics (2 cm long x 1.3 cm outer diameter x 0.5 cm inner diameter) were fabricated from calcined particles of 35-45, 40-60, and 60-75 microns. Pressed ALCAP ceramics were sintered at 1315,1370, 1425 or 1455 C for 18, 24 or 36 hours. Three replicates of each ceramic were incubated separately in 10 ml phosphate buffered saline (pH 7.4) at 37 C that was changed every hour for the first six hours and every two hours for the next six hours. The parameters measured were amounts of calcium, phosphates and aluminum released from the ceramic and changes in the hydrogen ion concentration (pH) of the phosphate buffered saline (PBS). The pH of the surrounding PBS increased with a decrease in particle size and the time of sintering did not affect the pH of PBS. Significant amounts of calcium (0.08±0.03 to 1.1±0.3 mg) and phosphates (1.9±0.6 to 26.5±0.6 mg)were released from all ALCAP ceramics. However, the dissolution pattern was inconsistent. Majority of ALCAP ceramics released aluminum in the range of one microgram. This in vitro dissolution study of ALCAP ceramics shows that the aluminum phase of the ceramic resorbs very slowly whereas calcium phosphate resorbs at a faster rate. Since aluminum phase provides strength to ALCAP, this ceramic should prove to be an ideal device for replacing traumatized or excised bone.

BOARD B @ 10:00

MITOTIC ACTIVITY IN THE FEMALE REPRODUCTIVE TRACT OF THE SIBERIAN HAMSTER (PHODOPUS SUNGORUS) DURING THE ESTROUS CYCLE. C. Murray Bartley and Gary McCoy, Department of Anatomy, Wright State University School of Medicine, Dayton, Ohio 45435.

Relatively little is known about the physiology of the reproductive tract of this animal. The purpose of this study was to examine the mitotic activity of the female Siberian hamster reproductive tract during the estrous cycle. The vaginal cytology of mature virgin, female Siberian hamsters was examined daily to determine the estrous cycle. Groups of 4 animals were sacrificed at 1200h on diestrus, proestrus and estrus. Each animal received 200µg of colchicine i.p. 1h prior to sacrifice. At autopsy the entire reproductive tract was removed from each animal, trimmed of excess adnexa and prepared for histologic examination. Each region of the female reproductive tract was examined for arrested mitotic figures. Mitotic activity remained relatively constant in the vagina and cervix throughout the estrous cycle. Mitotic figures were restricted to the germinal layer of the vaginal and cervical epithelium. Uterine endometrial mitotic activity was significantly increased during proestrus probably in response to elevated estrogen levels produced by developing follicles during this stage. No mitotic activity was demonstrated in any region of the oviduct regardless of the cycle. Ovarian mitotic activity was the most variable. Mitotic figures were observed in all cell layers of developing follicles and developing corpora lutea. However, mature Graffian follicles and developed CL demonstrated no mitotic activity.

BOARD C @ 10:00

LATENCY AND REACTIVATION OF FELINE LEUKEMIA VIRUS INFECTION. J.L. Rojko, E.A. Hoover, S.L. Quackenbush and R.G. Olsen. Department of Veterinary Pathobiology, O.S.U., 1925 Coffey Rd., Columbus, Ohio,43210.

All cats infected by the horizontally transmitted feline leukemia virus (FeLV) develop persistent viral infection of bone marrow progenitor cells. The minority of cats develop highly expressed infections of marrow, systemic lymphoid tissues, and various epithelia which are followed by virus excretion, immunosuppression and onset of FeLV-related proliferative or antiproliferative disease usually within months. The majority of FeLV-exposed cats (>70%) develop transient productive infection of hemolymphatic cells that is curtailed in hemolymphatic tissues by host cellular and humoral immune mechanisms. It now appears, however, that FeLV persists as an integrated latent

BOARD D @ 10:00

A STANDARD POLYTENE CHROMOSOME MAP OF DROSOPHILA VIRILIS. Patricia A. Bullion and Jong S. Yoon, Department of Biological Sciences, Bowling Green State University, Bowling Green, Ohio 43403.

In order to study phylogenetic and cytogenetic relationships within the virilis species group, a standard polytene chromosome map has been needed. Since Drosophila virilis (5R 1D) is regarded as the modern ancestral form of the group, a standard polytene chromosome map of D. virilis was constructed. Third instar larvae of D. virilis (Pasadena strain) were dissected and salivary gland squashes made (Yoon et al., 1973). More than thirty photographs were taken from which polytene chromosome maps were constructed. New standard photographic maps revealed more detailed banding patterns and areas of band duplication within older hand-drawn standard maps (Hsu, 1952). Photographic standard polytene chromosome maps of D. virilis will be utilized for further studies of phylogenetics and cytogenetics within this species group. (Supported by NSF Grant DEB 80-11552).

infection in marrow myelomonocytic precursor cells and nodal T_y lymphocytes (which probably also originate in marrow). Infectious FeLV can be reactivated from these cells when they are liberated from host control mechanisms through ex vivo culture. Transient (60% of cats) or persistent (40% of cats) virus recrudescence in vivo is elicited by treatment of latently infected cats with adrenal corticosteroid hormones. We presume comparable degrees of viral reactivation also occur in vivo in response to senescence, or other immunosuppressive factors such as intercurrent infections or exposure to chemical toxins. These observations suggest a transition between host-virus relationships in the feline retrovirus system and those in which greater degrees of viral genomic latency predominate such as the ecotropic retroviral infections of cattle, gibbon apes, wild mice, and the horizontally transmitted oncogenic human, simian, and avian herpesvirus infections.

BOARD E
@ 10:00

STRUCTURAL FEATURES OF THE SIBERIAN HAMSTER EXCURRENT DUCT SYSTEM. Nagy, F., Pendergrass, P. and J. Scott, Department of Anatomy, Wright State University, School of Medicine and College of Science and Engineering, Dayton, Ohio 45435.

The epididymis of the Siberian hamster (Phodopus sungorus) has been found to consist of eight zones with distinctive histological and cytological characteristics. Preparations were examined with the light microscope following staining with either a nucleal-PAS-orange G or phenylenediamine procedure. Nuclear configurations in the principal cells range from highly irregular profiles in the initial segment to more typical round or oval shapes in the remaining more distal zones. The proximity of the nuclei to the basement membrane varies from zone to zone but is consistent within a particular zone. Each zone can be characterized by a specific pattern of Schiff-positive granules within the cytoplasm of the principal cells. There are variations in the size and concentrations of the granules among zones as well as stratigraphic discontinuities between adjacent zones. Tubular morphology is consistent with descriptions of other mammalian epididymides in all zones except zone six. Here are found systems of auxillary tubules of lesser caliber than the main tubules. While the main tubules carry seminal fluid and spermatozoa the auxillary tubules appear to act as repositories for dead and/or dying cells and degenerating cellular organelles. It is most unusual to find apparently normal spermatozoa in the auxillary tubules even though they are directly contiguous with the main tubules at certain loci. Another feature peculiar to zone six is the presence of crystalline structures within some of the principal cells. These crystals are shown with the electron microscope to be regularly lamellated. The peculiarity of nuclear inclusions found in the most distal epididymis (zone eight) is also present in the cells of the proximal part of the vas deferens.

10:00

FREE STANDING

MAYA PALEOPATHOLOGY: AN INTERDISCIPLINARY INQUIRY. F.P. Saul, A.J. Christoforidis, J.M. Saul. Departments of Anatomy and Radiology, Medical College of Ohio, Toledo, Ohio, 43699.

The decline of Maya civilization well before the arrival of Europeans has created an interesting puzzle. In the past, only cultural or ecological data have been used to support the varying explanations for this pre-Columbian collapse, ranging from disease and crop failure to revolt and invasions. We have therefore studied the previously neglected Maya skeletal remains excavated by Harvard U., Cambridge U., etc., expeditions to archeological sites in Mexico, Guatemala and Belize. Lesions relating to malnutrition and childhood illness help explain the decline of Maya civilization and the accompanying reduction in stature, while also providing new time depth for present day health problems in the area (iron deficiency anemia, vitamin C deficiency, weanling disease). A group of individuals bearing lesions suggestive of the pre-Columbian presence of treponemal infections (syphilis or yaws) revive an old controversy of interest to historians of medicine, as do lesions pertaining to pre-Columbian tuberculosis and Paget's Disease. Although few "violent" injuries are evident, culture has left its mark on bones and teeth (head shaping, dental decoration, dental attrition, etc.). The above plus a variety of other disorders are presented and discussed using photographs and radiographs.

Supported by National Science Foundation Grant No. BNS-8101759 and a National Geographic Society Research Grant.

BOARD A
@ 2:00

ESTROGEN-INDUCED UTERINE GLYCOGEN IN THE SIBERIAN HAMSTER (PHODOPUS SUNGORUS). Gary S. McCoy and C. Murray Bartley, Department of Anatomy, Wright State University School of Medicine, Dayton, Ohio 45435.

Estrogen has been demonstrated to stimulate deposition of uterine glycogen in several experimental animals. Low dosages of estrogen result in an increase in myometrial glycogen. High dosages of the ovarian hormone have been shown to increase the glycogen content of the luminal epithelium in some species. Relatively little is known about the uterine physiology of the Siberian hamster. Therefore, the purpose of this study was to determine the effects of estrogen on uterine glycogen in the Siberian hamster. Mature virgin, female Siberian hamsters, 60-75 days of age were bilaterally ovariectomized. Two weeks post-operative, groups of 4 animals were injected with either 10µg or 20µg of estradial-17β-diproprionate s.c., and sacrificed at 3h, 6h, 12h and 24h post-injection. At autopsy the

uterus was removed, trimmed of excess mesometrium, and weighed. A portion of the uterus was prepared for histochemical observation of glycogen by the PAS method. The remainder of the uterus was processed for biochemical glycogen determination by the anthrone technique. Uterine glycogen levels decreased below control levels 3h post-injection, recovered by 6h and significantly increased 12h after hormone treatment. 24h post treatment uterine glycogen levels remained significantly elevated over control levels but were decreased from the 12h response. The estrogen-induced uterine glycogen was observed histochemically to be deposited in the myometrium.

BOARD B @ 2:00

CAMBARUS (CAMBARUS) BARTONII CARINIROSTRIS HAY,1914 IN OHIO. Roger F. Thoma, The Ohio State University, Columbus, Ohio, 43210 and Raymond F. Jezerinac, The Ohio State University, Newark, Ohio, 43055.

Cambarus (Cambarus) bartonii carinirostris Hay,1914 inhabits the streams of the Flushing Escarpment, the Mahoning River drainage, and the Grand River drainage in eastern and northeastern Ohio. This distributional pattern coincides with the preglacial drainage of the Pittsburg River. The Ohio populations of C. (C.) b. carinirostris differ from Cambarus (Cambarus) bartonii bartonii (Fabricius,1798), which does not occur in the state, by having thicker rostral margins, less gaping fingers, stronger dorsal longitudinal ridges on the chela, and by the enlargement of the 3rd. or 4th. mesial tubercle on the propodus. C. (C.) b. carinirostris differs from an undescribed member of the subgenus Cambarus found in Ohio by its wider areola, more accuminate rostrum, and lack of a second row of 4 or 5 palmer tubercles. C. (C.) b. carinirostris is most abundant in moderate to high gradient streams that are less than 4 m in width and is associated with Cambarus (Puncticambarus) robustus Girard,1852 and Orconectes obscurus (Hagen,1870).

BOARD C @ 2:00

AN ILLUSTRATED KEY TO THE OHIO SPECIES OF CAMBARUS AND FALLICAMBARUS (DECAPODA: CAMBARIDAE), WITH NOTES ON THEIR IDENTIFICATION, RANGE, HABITATS, AND CRAYFISH ASSOCIATES. Raymond F. Jezerinac, The Ohio State University, Newark, Ohio, 43055 and Roger F. Thoma, The Ohio State University, Columbus, Ohio, 43210.

This article presents an illustrated taxonomic key that utilizes chela and carapace structures to identify the six species of Cambarus and one species of Fallicambarus known to occur in Ohio. Those species that are generally found throughout the state are Fallicambarus (Creaserinus) fodiens (Cottle,1863) and Cambarus (Lacunicambarus) diogenes diogenes Girard,1852, both are primary burrowers, Cambarus (Cambarus) sp. A, an undescribed species which is a secondary burrower, and Cambarus (Puncticambarus) robustus Girard,1852, which occurs in all permanently flowing streams. Species with restricted distributions are Cambarus (Cambarus) sciotensis Rhoades,1944a, a stream crayfish in the Scioto River, Little Scioto River, and tributaries of the Ohio River in southcentral Ohio, Cambarus (Cambarus) ortmanni Williamson,1907, a primary burrower confined to the Ordovician region of southwestern Ohio, and Cambarus (Cambarus) bartonii carinirostris Hay,1914, a river crayfish in streams of the Flushing Escarpment, the Mahoning River, and Grand River drainages in eastern and northeastern Ohio. As expected, species with broad distributions generally have more crayfish associates than those with restricted distributions. Cambarus (Erebicambarus) laevis Faxon,1914, reported by Rhoades (1944a) as C. b. laevis, does not occur in Ohio. Specimens previously identified as this species are either C. (C.) ortmanni or C. (C.) sp. A.

BOARD D @ 2:00

COMPUTER SIMULATIONS FOR UNDERGRADUATE GENETICS COURSES. Kenneth P. Klatt, Department of Biology, Denison University, Granville, Ohio 43023.

I have developed four computer simulations that have been used at Denison. The four simulations, which are written in Basic, are called PROSEQ, DNASEQ, BRED and BEAK. PROSEQ generates a 20 amino acid protein. The program then guides the student through the biochemical procedures needed to elucidate the amino acid sequence of the protein. The program of DNASEQ generates a 10 base pair DNA molecule; the stimulation then guides the student through the Sanger +/- method of determining the nucleotide sequence of the DNA molecule. The BRED simulation generates a hypothetical mouse which contains certain major histocompatibility antigens (MHC). The students then must perform tissue typing and test crosses to solve the linkage relationships between the various MHC alleles. BEAK, which was originally designed for our freshman-level non-majors course, generates a hypothetical chicken with a certain beak color and beak size. The students then cross two generations of these hypothetical chickens to determine the dominance and linkage characteristics of the alleles at the beak color and beak size loci.

BOARD E @ 2:00

MASKED CYTOKININS AND NICOTIANA GLAUCA TISSUE CULTURE GROWTH
David Martin Law and David F. Blaydes
Department of Biology, West Virginia University, Morgantown, West Virginia 26506

The effects of the cytokinins, 6-benzylaminopurine (BA) and 6-benzylamino-9-methylpurine (MBA) upon the growth of callus cultures of Nicotiana glauca were compared. This tissue is inhibited by the application of an exogenous cytokinin. If formation of the ribonucleoside or ribonucleotide is necessary for activity, then the 9-methyl group should prevent attachment of the ribose moiety, and growth inhibition should not result in tissue grown on MBA.

The tissues were grown on Miller's modified medium in constant light and at a constant temperature (24° ± 1°C). A control without cytokinins and hormonal concentrations of 10^{-11} M, 10^{-8} M, 10^{-7} M, 10^{-6} M, and 10^{-5} M were compared. Fresh and dry weights were recorded weekly for six weeks, and tested by analysis of variance.

Growth of tissue treated with BA was inhibited at concentrations above 10^{-8} M. Callus growth was also inhibited by MBA, although not to as great an extent, when measured by fresh weights. Dry weights generally paralleled fresh weights. However, dry weight percentages of fresh weight were higher for the tissues treated with the upper concentrations of BA.

The results would appear to indicate that either prior formation of the ribonucleoside or ribonucleotide is not necessary for cytokinin activity, or that the nine-methyl group did not serve as an effective block. If the latter is true, then MBA could gain activity by conversion to the free base. Dry weight percentages of fresh weight, and physical characteristics of the tissue, might support the hypothesis that cytokinins cause inhibition of growth by restricting cell enlargement.

BOARD A @ 3:00

A NEW OHIO QUATERNARY MAP R. P. Goldthwait, Box 656, Anna Maria, 33501

A hand-colored Quaternary Map of Ohio on the scale of 1:250,000 (1" - 4 mi) is now complete. It was prepared for the 1:1,000,000 Quaternary Map sheets being published by U.S. Geological Survey. The western two-thirds of Ohio, exhibited here, shows more detail than any former glacial map; much unpublished material is included from soil surveyors and reliable student theses. It includes the unglaciated area: all large landslide areas from Ohio Environmental studies, and grades of colluvium(sand-rich, silty, clay-rich).

Wisconsin-aged till types, as differentiated by granulometry, color, clay minerals, and calcium carbonate are named and separated by heavy hashured lines. Actually these tills extend stratigraphically like shingles one under the othen Outer limits of any one till tend to follow near but not exactly on an end moraine. Buried southerly (distal) limits covered by overlap, are shown by dashed lines. Radio carbon dates on each line are rounded out from 2 to 15 dates on wood within each till. Basal Wisconsin till wood or forest beds half incorporated show that original advance across Ohio was 160 to 350 feet per year, less southward, and the ice vacillated for 4,000 years within 20 miles of its most southerly extent before a catastrophic retreat averaging more than 265 feet per year.

BOARD B @ 3:00

SYSTEM FOR CONTINUOUS FLOW RESPIROMETRY OF SMALL AQUATIC ORGANISMS.
Jerry H. Hubschman. Wright State University, Dayton, Ohio 45435

The system described provides capability for continuous flow differential measurement of ambient oxygen concentrations entering and leaving the experimental chamber. Controlled input variables for experimental purposes are: flow rate, turnover rate, dissolved oxygen concentration, and temperature. Dissolved O_2 levels of incoming water can be controlled and stabilized over a range of 0.1 mg O_2/liter to saturation. Temperature is controlled over a range from 1°C through any practical biological limit. For example, good uptake data have been obtained from crayfish at 20°C with a flow rate of 11 ml/min with ambient O_2 concentrations from 0.5 to 9.0 mg O_2/liter. Provision is included for metered delivery of test substances in solution in which case a blank chamber is included in the system.

BOARD C @ 3:00

SURFACE MORPHOLOGY OF MICROCOTYLE SPINICIRRUS (TREMATODA: MONOGENEA) John C. Mergo Jr. and John L. Crites, Department of Zoology, Ohio State University, Columbus, Ohio, 43210

The surface morphology of Microcotyle spinicirrus, a gill fluke of the freshwater-drum, Aplodinotus grunniens, was studied by light and scanning electron microscopy (SEM). Features examined on adult trematodes included the mouth, oral suckers, gonopore, and the holdfasts, while the same features along with the larval haptor were observed on juvenile specimens. When viewed using light microscopy, the mouth of adult specimens appeared to be straddled by two round muscular suckers which possess a row of square papillae on their surface. SEM shows that two distinct suckers do not exist. The mouth appears as a

single opening not directly associated with muscular suckers. The papillae noted in light microscopy may be seen lining the oral cavity in SEM. The holdfasts, gonopore, and larval haptor all seem to possess sclerotinized hooks, anchors, or spine-like structures which protrude from the surface of the trematode when viewed under the light microscope. SEM illustrates that the holdfasts and gonopore are covered by the tegument and do not protrude from the surface of the parasite, while the larval haptor is partially covered by the tegument. The distal ends of the haptoral anchors may be seen projecting through the tegument.

BOARD D @ 3:00

A NOVEL SENSITIVE IN VIVO RECEPTOR ASSAY FOR POLYPEPTIDE HORMONES D.C. Whitcomb, M.T. Nishikawara, C. Cataland and T.M. O'Dorisio. Departments of Physiology and Medicine, Ohio State University, Columbus, Ohio 43210

Specific binding of polypeptide hormones have been demonstrated qualitatively in vivo. We report an in vivo receptor binding assay sensitive enough to quantitate specific hormone binding and/or uptake by most tissues. Computer modeling is based on a kinetic in vivo model, autoradiographic studies and plasma volume determinations using radiolabeled albumin. Both ^{125}I-insulin and ^{131}I-labeled albumin were infused into rats with or without a high concentration of unlabled insulin (+ or - ULI). Changes in these tracers in plasma with time were followed. Tissue samples were then used to compute plasma space, apparent interstitial space available for hormone diffusion (AIS) and specific binding of hormone from the plasma tracer evaluation. Further modeling of the hormone-receptor kinetics revealed the following values for plasma volume (ul/gm), AIS (ul/gm) and specific insulin binding (pg bound/gm wet wt.).

TISSUE		PLASMA VOLUME	AIS	BOUND INSULIN
LIVER	(+ULI)	93.9 ± 14.5 ul/gm	481.1 ± 51.5 ul/gm	
	(-ULI)	84.5 ± 12.1 (n.s.)	3605.8 ± 93.6 **	15026.0 ± 390.0 **
MUSCLE	(+ULI)	5.3 ± 0.7	44.1 ± 2.2	
	(-ULI)	5.8 ± 0.6 (n.s.)	60.5 ± 12.4 *	184.5 ± 37.7 *

(Using Students t-Test, *< 0.025, **< 0.005). Concentrated glucagon had no effect on insulin binding demonstrating specificity. This assay will be useful for studying receptors in vivo.

BOARD E @ 3:00

EFFECT OF DIETARY PROTEIN ON RENAL UREA SYNTHESIS AND URINARY CONCENTRATING ABILITY. Margaret M. Mullins and Robert O. Banks. University of Cincinnati and Wright State University, Dayton OH 45435.

Urea is essential to body water homeostasis through its enhancement of urine concentration. The ability of the kidney to synthesize urea is of interest and some controversy. We tested the hypothesis that low plasma urea concentrations (PLU) would stimulate renal urea synthesis, enhancing urinary concentrating ability. We measured synthesis of urea by the kidneys of dogs on 1 of 3 dietary treatments selected to induce a wide variation in PLU: 1) chow ad libitum (n=8); 2) 1/8 recommended chow by weight/day (n=21); 3) protein-free, high calorie pellet with vitamin-mineral supplement (n=19). Some of each diet group had free access to water while others were water-deprived 16-24 hours before the experiment. Using a constant infusion of 14-C-urea and chemical assay of total urea in plasma and urine, the ratio specific activity plasma/specific activity urine (SA ratio) was calculated. An SA ratio > 1.1 indicated de novo intrarenal urea synthesis. A significant inverse relationship between PLU and SA ratio occurred only in group 2, despite the fact that plasma urea levels in this group were highest of the 3 groups. In addition, this group was more likely to demonstrate renal urea synthesis than the others. Only access to water had any significant impact on urine concentrating ability, although protein depletion resulted in somewhat lower and a SA ratio > 1.1 in a higher urine osmolality. We conclude that the dog kidney is capable of de novo urea synthesis, but that a reduced plasma urea concentration does not appear to be the stimulus for this activity. (Supported in part by NIH grants HL-14348 and 1F04-NU-27,374.)

SEE PAGE 29

DEEP STAGE DRAINAGE OF OHIO. Donald C. Rice and Frank L. Koucky, Department of Geology, The College of Wooster, Wooster, Ohio, 44691.

The hypothesis that a Pre-Illinoian East-West forebulge developed across Ohio in response to an advancing Illinoian ice sheet is discussed. This rising anticlinal structure disrupted the pre-existing stream patterns and rejuvenated streams, allowing cutting into the bedrock. This gorge cutting period has been called the "Deep Stage" drainage. The location and gradients of the "Deep Stage" drainage in Ohio in relation to the forebulge are shown.

Post glacial relaxation (isostatic readjustment) of the forebulge again caused disequilibrium of the drainage, which allowed rapid thick valley fills and possibly the development of the ancestral Great Lakes.

A Wisconsin "Deep Stage" drainage probably developed, but it followed a pattern inherited from the Illinoian glaciation and its effects were less pronounced with little cutting to bedrock.

WOMEN IN SCIENCE SYMPOSIUM

SATURDAY, APRIL 24, 1982

DENNEY HALL 352

DR. JANE M. DECKER, PRESIDING

2:00 WHY DO WOMEN CHOOSE SCIENCE CAREERS? Erika Bourguignon, Semra Somersan and Anna Bellisari. Department of Anthropology, Ohio State University, 208 Lord Hall, 124 West 17th Avenue, Columbus, OH 43210

This paper will consider the implication of dominant American core values (self-reliance, independence, self-assertion, competition, mobility, teamwork) which are often viewed as specifically male attributes, for women's career choices and for the manner in which such choices are arrived at. Various processes of role-modeling, guidance, self-perception, and sex role expectations are examined, as are a variety of institutional norms. The state of the literature is considered, as well as strategies for new research to deal with the questions that are raised.

2:15 OHIO WOMEN IN SCIENCE: CHOICES. Janet Varner Jenks. 1027 State Route 343, Yellow Springs, Ohio 45387.

Biographical interviews of Ohio women, born before 1910, who have made contributions avocationally or vocationally to the fields of natural science, are being collected. Many women have made and are making contributions to science. However, documentation is sparse and not readily available. The collection of oral history is an important way to document the experiences of women scientists. Oral history projects can provide opportunities to learn about particular women, while their collective experiences provide a rich heritage for persons trying to understand the workings of science and the scientist. These aspects of the project will be shared as well as selected materials, released by the interviewees, from the interviews. The project is ongoing.

2:30 WOMEN IN SCIENCE: OPTIONS AND STATUS. Mary M. McKown. Battelle, Columbus Laboratories, 505 King Avenue, Columbus, Ohio 43201.

Women have always been involved in science and many have played key roles in significant research and development. The pioneers who were the first women to break sex barriers in various fields have been widely publicized. The woman who makes her career in science today has a number of options in addition to selecting a major field of study, such as chemistry, biology, physics, geology, or medicine. Several general job titles will be examined regarding status in the scientific community and opportunities for advancement or career change. These job titles include:

- Professor of Physics at major university
- Manager of Analytical Chemistry R&D at research institute
- Marketing Manager for pharmaceutical firm
- Chief Ecologist for major oil company
- Therapist for metropolitan mental health clinic
- Surgeon/Researcher at major medical school
- Computer scientist for large corporation.

Typical profiles pertaining to training prerequisites and theoretical career patterns will be presented. Various indices will be employed to provide a spectrum for comparing characteristics deemed necessary for productive, successful careers.

2:45 COMPENSATION OF WOMEN IN SELECTED RESEARCH AND DEVELOPMENT OCCUPATIONS. Margaret Spurgeon, Battelle-Columbus Laboratories, 505 King Avenue, Columbus, OH 43201
Jean Newborg, Battelle-Columbus Laboratories, 505 King Avenue, Columbus, OH 43201

The National Survey of Compensation Paid Scientists and Engineers Engaged in Research and Development Activities has been conducted annually by Battelle under contract to the U.S. Department of Energy since 1968. The primary use of the data is for planning compensation budgets for research staff employed at national laboratories, nonprofit institutions, educational institutions, federal agencies, and in private industry. The objectives of the current paper are to analyze the characteristics of salary distributions

for women scientists and engineers, and to compare those distributions to similar data for men.

Salary levels and growth in salary will be investigated for entry level positions, 2 years after degree, and 5 years after degree for broadly defined degree/occupation categories. Both levels and growth rates will be compared between men and women. The adequacy of the survey information will be discussed. Methodology for conducting these types of analyses will be presented and critiqued.

A FEMINIST RE/VISION OF SCIENCE: THEORETICAL AND PRACTICAL CONSIDERATIONS.
Elisa Triffleman, 26 Curtis Avenue, Somerville, Mass., 02144

3:00

I. What is meant by a feminist re/vision of science? A. Not male and female molecules. B. Feminism as an analysis of institutions within cultural, political, economic and personal frameworks. II. Why critique contemporary science? A. Post WWII science as an Establishment institution: a historically anomalous position. B. Recession yields a decreased level of funding, with increased criticism of surviving projects. C. Self-conscious critique already emergent in application-of-knowledge problems. D. The means don't justify the ends, or, institutional structure and humane knowledge. III. Previous critiques and their limitations. IV. The Feminist Solutions. A. Reevaluation of the stratification of scientific institutions and their restructuring. B. Reevaluations of the scientific identity. C. Re-evaluation of the ethos of science. D. Turning theory into practise. Note that the majority of this presentation is concerned with American academic science, although illustrations will be drawn on occasion from other cultures.

Discussants:

3:15

Ms. Sue T. Kindred, Director and
Office of Affirmative Action
The Ohio State University

Dr. Shirley M. Malcolm, Head
Office of Opportunities in Science
The American Association for the Advancement of Science
Washington, D.C.

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